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GRADUATE COLLEGE

BULLETIN 1975-76

UNIVERSITY OF ILLINOIS
AT THE
MEDICAL CENTER, CHICAGO

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UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Academic Calendar

1975-76

Fall Quarter 1975

August 4 (Monday)	Admissions applications for fall quarter due
September 15-19 (Monday-Friday)	Registration
September 19 (Friday)	Last day for completion of degree requirements without further registration
September 22 (Monday)	Instruction begins
October 1 (Wednesday)	Last day for late registration
October 13 (Monday)	Columbus Day–holiday (no classes)
October 20 (Monday)	Admissions applications for winter quarter due
October 31 (Friday)	Last day to withdraw from a course, change program, or change registration from audit to credit
November 7 (Friday)	Last day for Graduate College approval of thesis format for fall quarter
November 14 (Friday)	Last day for deposit with Graduate College of approved theses for fall quarter, and for addition of names to fall quarter graduation list
November 27 (Thursday)	Thanksgiving holiday (no classes)
November 28 (Friday)	No holiday (no classes)
December 1-5 (Monday-Friday)	Examination period; registration for winter quarter
December 6 (Saturday)	Quarter ends; degrees conferred

Winter Quarter 1976

January 2 (Friday)	Last day for completion of degree requirements without further registration
January 5 (Monday)	Instruction begins
January 14 (Wednesday)	Last day for late registration
February 2 (Monday)	Admissions applications for spring quarter due
February 6 (Friday)	Last day to withdraw from a course, change program, or change registration from audit to credit
February 16 (Monday)	Presidents' Day–holiday (no classes)
February 20 (Friday)	Last day for Graduate College approval of thesis format for winter quarter
February 27 (Friday)	Last day for deposit with Graduate College of approved theses for winter quarter, and for addition of names to winter quarter graduation list
March 15-19 (Monday-Friday)	Examination period; registration for spring quarter
March 20 (Saturday)	Quarter ends; degrees conferred

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BULLETIN 1975-76

UNIVERSITY OF ILLINOIS
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University of Illinois

BOARD OF TRUSTEES

Members Ex Officio

Daniel Walker, Governor of Illinois....................Springfield 62706

Elected Members

1971-77

William D. Forsyth, Jr............P.O. Box 2209, 1201 South Fourth Street, Springfield 62703
George W. Howard III....Howard Building, Box U, Mount Vernon 62864
Earl L. Neal.......Suite 1525, 111 West Washington Street, Chicago 60602

1973-79

Ralph C. Hahn.................1320 South State Street, Springfield 62704
Park Livingston.................202 South Kensington, La Grange 60525
Jane Hayes Rader..............Windridge Farm, Route 2, Cobden 62920

1975-81

Robert J. Lenz.......................P.O. Box 820, Bloomington 61701
Nina Shepherd.........................256 Scott Lane, Winnetka 60093
Arthur Velasquez.........................Azteca Corn Products Corp., 4850 South Austin, Stickney 60402

Officers of the Board

Earl L. Neal...Chicago
Earl W. Porter, Secretary...Urbana
Robert R. Manchester, Treasurer..............................Chicago
Ronald W. Brady, Comptroller................................Urbana

ADMINISTRATIVE OFFICERS OF THE GRADUATE COLLEGE

President of the University............................John E. Corbally
Vice-President for Academic Development and Coordination..Barry Munitz
Chancellor of the Medical Center Campus..............Joseph S. Begando
Acting Dean of the Graduate College at the Medical Center Campus.... Ralph Daniels
Associate Deans of the Graduate College at the Medical Center Campus... Alan W. Donaldson, John P. Marbarger, Sabath F. Marotta

Fields of Instruction

Anatomy: M.S., Ph.D.
Keen A. Rafferty, Jr., Head

Bioengineering: Ph.D. — Intercampus
Irving F. Miller, Program Director

Biological Chemistry: M.S., Ph.D.
Thomas O. Henderson, Acting Head

Biology/Experimental Pathology:
Ph.D. — Intercampus

Graduate College: Electives
S. F. Marotta, Associate Dean

Histology: M.S.
Dale R. Eisenmann, Head

Medical Psychology: M.S.
Louis A. Fourcher, Head

Medicinal Chemistry: M.S., Ph.D.
James E. Gearien, Head

Microbiology: M.S., Ph.D.
Sheldon Dray, Head

Nursing Sciences: M.S.N., Ph.D.*
Helen K. Grace, Head

Oral and Maxillofacial Surgery: M.S.
Daniel M. Laskin, Head

Oral Pathology: M.S.
John P. Waterhouse, Head

Orthodontics: M.S.
John F. Cleall, Head

Orthopedic Surgery: M.S.
Robert D. Ray, Head

Pathology: M.S., Ph.D.
Elizabeth A. McGrew, Acting Head

Pedodontics: M.S.
Allen W. Anderson, Head

Pharmacognosy/Pharmacology:
M.S., Ph.D.
Norman F. Farnsworth, Head

Pharmacology: M.S., Ph.D.
Edmund G. Anderson, Acting Head

Pharmacy: M.S., Ph.D.
Martin I. Blake, Head

Physiology: M.S., Ph.D.
Roderich W. Walter, Head

Public Health Sciences: M.S.
Paul Q. Peterson, Head

Radiology: M.S.
Vlastimil Capek, Head

Surgery: M.S.
Lloyd M. Nyhus, Head

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* Pending approval of Ph.D. program.

I The University and the Graduate College

I-1. The University of Illinois was founded in 1867 and during the ensuing century has become one of the great universities of the world. Its original location at Urbana-Champaign is the site of the main campus. Over the years two campuses have developed in Chicago: at the Medical Center and at Chicago Circle. Graduate courses are offered at both Chicago campuses under their respective graduate colleges; their proximate locations permit concurrent study. The Graduate College at the Medical Center offers more courses and degree programs than comparable colleges on other campuses; more than 2,200 graduate degrees have been awarded since graduate work at the Chicago Professional Colleges was first initiated in 1924.

I-1.1. The Medical Center campus includes the Colleges of Dentistry, Medicine, Nursing, and Pharmacy; the Schools of Public Health and Associated Medical Sciences; and the Graduate College. It is located about three miles west of the Loop and is conveniently reached by bus or elevated train. The Graduate College offices are at 1737 West Polk Street and the mailing address is:

The Graduate College
University of Illinois at the Medical Center
P.O. Box 6998
Chicago, Illinois 60680
Telephone: (312) 996-4995

Prospective graduate students interested in areas other than basic health sciences should write to either:

The Graduate College
University of Illinois at Urbana-Champaign
330 Administration Building
Urbana, Illinois 61801
Telephone: (217) 333-0035

or

The Graduate College
University of Illinois at Chicago Circle
P.O. Box 4348
Chicago, Illinois 60680
Telephone: (312) 996-3320

I-2. Graduate education is predominantly an intellectual adventure and has as its chief objective the encouragement of advanced achievement in the form of productive scholarship.

I-2.1. A major requirement for both the M.S. and Ph.D. degrees is a thesis based on a research problem. Degrees are granted to students whose level of scholarship and investigative endeavor indicates that they have mastered a definite field of knowledge and recognize its potentialities and opportunities for further advances. Doctoral training in particular is not a matter of successfully completing a specific number of advanced courses, but rather emphasizes original laboratory or scholarly investigation.

I-2.2. High standards for admission of students are maintained and careful selection of faculty members insures that qualified advisers will be available to graduate students. Laboratory, clinical, and library facilities are outstanding.

I-3. Graduate study at the Medical Center campus of the University of Illinois is designed for highly motivated, superior students who desire to pursue advanced work in the basic sciences. Graduates of liberal arts colleges in the United States with majors in biology, chemistry, engineering, physics, or psychology are considered for admission. A professional college degree in dentistry, medicine, nursing, or pharmacy is required for advanced work in some areas.

I-3.1. Graduate programs lead to M.S. and Ph.D. degrees in such fields as anatomy, bioengineering, biological chemistry, medicinal chemistry, microbiology, nursing sciences, pathology, pharmacognosy, pharmacology, pharmacy, and physiology. M.S. degrees, only, are offered in certain applied science areas upon completion of formal course work and a thesis based on research. Credit toward an academic graduate degree is not allowed for clinical work or for work of a purely vocational nature. Curricula are suitable for students planning careers in teaching and research in academic, industrial, and governmental institutions.

II Admission

II-1. Early Application. Since it takes considerable time to process and evaluate their credentials, prospective students should apply for admission as early as possible, up to one year before the beginning of the term in which they expect to enroll. Since the number applying greatly exceeds the number of students who can be accepted, admission is competitive and may be denied to qualified applicants. Application forms may be obtained from the Office of Admissions and Records (see section II-5.2.) or from the departments.

II-2. Requirements. To be considered for admisssion to the Graduate College an applicant must be:

(a) A graduate of an institution awarding a baccalaureate degree comparable to that granted by the University of Illinois.

(b) Adequately prepared for advanced study as demonstrated by his previous program of study and scholastic record.

(c) Recommended for admission by the department of proposed study and by the dean of the Graduate College.

II-2.1. Prerequisites for advanced work in particular fields are listed in the departmental sections of this bulletin and more detailed information on courses and prerequisites may be obtained by writing directly to individual departments. Where departments have requirements in addition to those of the Graduate College (e.g., special prerequisites for admission, foreign language), these are administered at the departmental level.

II-3. Ordinarily applicants should be graduates of colleges with majors in an appropriate science (e.g., biology, chemistry, physics, psychology), engineering, mathematics, nursing, or other suitable background for advanced study. In some areas a B.S. degree in nursing or pharmacy or a D.D.S. or M.D. degree may be required.

II-4. Minority Group Applicants. Special consideration is given to applications of promising individuals of minority backgrounds.

II-5. Submission of Applications. New applicants and prospective students who have previously applied for admission to the Graduate College should complete and forward an application for admission and the supplemental data required for admission. Action cannot be taken until all admission data are on hand. Applicants should present:

(a) College-level courses in biology, chemistry, mathematics, and physics.

(b) A bachelor's, master's, or professional degree (M.D., D.D.S., or D.V.M.).

(c) Three letters of recommendation from college instructors.

(d) TOEFL (Test of English as a Foreign Language) examination* results (foreign students only).

(e) Graduate Record Examinations* scores: aptitude test (verbal and quantitative). See section II-5.1.

(f) A brief statement of scientific and professional interests and objectives.

(g) A $20 nonrefundable application fee.

II-5.1. Graduate Record Examinations (GRE). Since the number of students who can be accommodated is limited, and only the most qualified are admitted, applicants should be aware that GRE scores may provide supplementary evidence of promise for graduate work. The verbal and quantitative portions of the GRE are essential elements of the admissions application, except for dental and medical students, or holders of dental or medical doctorates, seeking only the M.S. degree, who are not graduates of foreign schools (see section II-7.). Scores on the advanced test of the GRE in biology, chemistry, engineering, mathematics, psychology, or physics, may appropriately be submitted for consideration in some departments. Consult the departmental entry in this bulletin, or contact the department directly for information on this point. GRE scores are ordinarily required as part of applications for Graduate College fellowships.

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* For these examinations, apply to: Educational Testing Service, Princeton, New Jersey 08540.

II-5.2. Application forms, transcripts, letters of recommendation, and other correspondence should be addressed to:

Office of Admissions and Records
University of Illinois at the Medical Center
P.O. Box 6998
Chicago, Illinois 60680

II-6. Foreign Applicants. Foreign applicants for graduate study should enclose with their initial inquiry for admission copies of their complete academic records which have been officially certified by the educational institutions previously attended. These official records should include a list of all final degrees, diplomas, or certificates awarded. An authenticated English translation must accompany all documents that are in a language other than English.

II-6.1. Foreign applicants must also provide the following information: full legal name; address to which reply should be mailed; place and date of birth; name of the country of which now a citizen; marital status; form of permanent physical handicap, if any; the subject in which specialization is desired; native language; amount in United States dollars available for support, the source of income, and the length of time this support is guaranteed; a complete chronological listing of all elementary and secondary schools and colleges attended, with the exact dates of attendance, and diplomas, certificates, or degrees received; if not attending school, occupation since leaving school; and the date of planned entry to the Graduate College.

II-6.2. Prior to consideration for admission, foreign applicants whose native language is other than English must pass TOEFL (Test of English as a Foreign Language), unless a degree has been received from an accredited college or university in the United States, the United Kingdom, Canada (except Quebec), Australia, or New Zealand. The examination is given at various times of the year in many centers throughout the world. Upon receipt of satisfactory English test results and the completed application data, documents admitting the student to the Graduate College, including an appropriate certificate to apply for a visa to enter the United States, can be issued.

II-6.3. According to Immigration and Naturalization Service regulations, a foreign person on an F-1 (Student) Visa must register in accordance with the following: in master's degree program — *full time;* in doctoral degree program — *no less than one-half time.*

II-7. Graduates of Foreign Schools. All graduates of foreign schools must present scores on the Graduate Record Examinations (verbal and quantitative) at or above the level of prevailing standards.

II-8. Health. Each applicant to the University of Illinois at the Medical Center who is tentatively accepted must have a physical examination by the health service on the Medical Center campus. The student is responsible for making an appointment for this examination, which should be arranged for as early as possible and must be completed prior to the time of registration. The student should, if possible, bring a record of immunizations.

II-8.1. It is strongly urged that each applicant, after acceptance, visit a physician and dentist, attending to such items as dental repairs and fitting for glasses. After instruction has started it will be difficult to have these done without loss of time from classes.

III Rules and Regulations

III-1. Registration. Graduate students must register at the beginning of each quarter. Initial registration is permitted only after official acceptance of the student by letter from the Graduate College Office.

III-1.1. Registration forms and instructions are available at the Graduate College Office. Following consultation in the department the student is assigned a major adviser with whom a program of study and research is discussed. After obtaining the signature of the major adviser, the student obtains the signature of the instructor for each course on the registration form. The form is then submitted to the Graduate College Office for approval. Admission to graduate courses is granted only to persons who have the requisite undergraduate work. Registration, including the payment of fees, must be completed during the period scheduled for that purpose. If a student is unable to handle registration or preregistration procedures in person, the adviser or some other responsible individual may act instead.

III-1.2. Preregistration. There is a preregistration period scheduled by the Office of Admissions and Records during which students are expected to fill out a green registration slip and a yellow program card. The registration slip must have the approval of the instructor(s) and major adviser. A change of program before final registration must be made on the proper form, which can be obtained in the Graduate College Office, and cannot be completed until the registration period (see calendar).

III-2. Retroactive Registration. No form of retroactive registration is permitted.

III-3. Change of Program and Withdrawal from Courses. The graduate student is expected to plan work carefully with the adviser. A change of program is permitted, within the time allotted for this purpose as indicated in the calendar, if approved by the major adviser, the instructors involved, and the dean of the Graduate College. If a student wishes to drop a course (withdraw) or to add other work, an official change slip must first be secured from the Graduate College Office. No grade is given in case of official withdrawal. A student who ceases to attend class without official approval receives a grade of E (failure). The last dates to withdraw from a course, as given in the Academic Calendar, are strictly observed. Exceptions to permit later withdrawal without penalty are made only for urgent reasons such as the student's ill health or extraordinary circumstances.

III-3.1. Change in Major Subject. A student who wishes to transfer from one department to another must secure the written approval of the two departments involved and the dean.

III-3.2. Withdrawal from the Graduate College. When students discontinue course work and leave the campus, even for a single quarter, they should obtain approvals by means of a clearance slip. Exceptions to this procedure for the summer quarter only are made for M.S.N. students. This enables the University officially to deal with the students' previous area of business, loans, scholarships, library transactions, student affairs activities, laboratory loans, housing bills, and grade completion. Without the clearance procedure these objectives may be defeated. The students' goals may change, they may go to another school, their health may be impaired, or their progress in the Graduate College interrupted.

Students who leave without official clearance may be requested to reapply through the usual competitive admissions procedure in order to take up their graduate studies at a later date.

Where students have officially withdrawn, they may take up graduate studies again without filing another admissions application form, subject to approval of the department and the Office of the Dean. However, it is difficult to readmit students on the spur of the moment. Students returning after an absence of one quarter or more should inform the Office of the Dean and then the Office of Admissions and Records at least by the fifth week of the preceding quarter to allow for an orderly production of the proper admissions material — fee cards, scholarship or trainee and other stipend arrangements — and allow for the assessing of fees.

III-4. Status of Students.

(a) *Degree Candidates.* Students accepted under prevailing standards of admission and registered in a master's or doctoral program of courses. The term *candidate* is also used more specifically to describe a doctoral student in the process of meeting final requirements.

(b) *Special (Irregular) Students.* Nondegree students enrolled for the purpose of taking specific courses only. Special students are admitted under the same prevailing standards as degree candidates and may obtain transcript credit for passing grades.

(c) *Auditors or Course Visitors.* Graduate students, or persons not registered in the University of Illinois, are permitted to attend classes (other than laboratory courses) as auditors, provided a visitor's permit bearing the approval of the instructor and the dean of the Graduate College is filed with the Office of Admissions and Records. Permits are available from the Graduate College Office; fee, $15 per course; no credit. Auditors need not apply for admission to the Graduate College. The visitor's fee is not charged auditors who are enrolled as full-time students on campus. A graduate student should not enter on his registration form any courses which he plans to attend as an auditor.

A *visitor* is only a listener in the classes attended, not a participant in any part of the exercises. A student who has attended a class as a visitor will NOT be allowed an examination for credit in the course. Names of visitors do not appear on course rosters. No instructor is allowed to admit any such listeners to any of his classes except on presentation of a written certificate showing that the student has complied with the foregoing conditions. The visitor's fee is refunded if the visitor withdraws during the first ten days of instruction. No refund is given for a withdrawal after this date.

Persons in the employ of the University may audit without fee on the recommendation of the head of the department in which the employee works, with the consent of the instructor of the course, and with the approval of the dean of the Graduate College and the Personnel Services Office.

If the visitor desires to change registration from audit to credit, this may be done with the approval of (or admission by) the Graduate College before the term is half finished (see calendar) and upon the payment of appropriate fees.

(d) *Probationary.* (1) Students with some deficiency in academic preparation or level of scholastic achievement are occasionally given conditional admission, but this is discouraged. Such students may be given degree status upon completion of the equivalent of a full quarter (16 quarter hours) of satisfactory work in formal courses (a grade of C or below during this period disallows further registration) and/or removal of the deficiency in preparation. (2) Students who fail to maintain scholastic standards as described in III-10.

(e) *Part-Time and Full-Time Students.* Students registered in degree programs for less than 12 quarter hours are called part-time; those registered for 12 to 16 quarter hours, full-time. Although students engaged in -499 Thesis Research for zero credit are not in full-time status, they may actually be engaged on campus in research or thesis preparation for a full schedule of hours. When so certified by adviser or department head to the Office of the Dean, the student remains eligible for fellowship, traineeship, or tuition waiver awards.

III-5. Credit for Courses. Courses numbered from 300 to 399 are open to advanced undergraduate and graduate students, and those numbered 400 and above are designed primarily for graduate students but may be available to others on a limited basis. Courses numbered below 300 do not carry graduate credit. Graduate credit is measured in terms of quarter hours (qh); the maximum for a full-time graduate student is usually 16 quarter hours each quarter.

III-6. Transfer of Credit. A graduate student who has completed graduate courses elsewhere may petition for a limited transfer of credit. Such a transfer must have the recommendation of the student's adviser and the head of the department in which the student is pursuing his program, and the approval of the dean. In such instances the department must be satisfied that the work is equivalent to the level of graduate courses offered by the University of Illinois and that the formal program of the student at this institution will be sufficient to warrant the awarding of the degree by the University of Illinois. The petition is not acted upon finally until the residence requirement is fulfilled.

III-6.1. Transfer of Students with a Master of Science Degree. Not more than the minimum number of hours (48) required for the master's degree may be applied to the total required for the doctorate (144 quarter hours) at the time of approval of the doctorate program.

III-7. Course Codes. With a few exceptions certain course numbers always indicate special types of courses: 440 to 449, Special Topics; 491, 492, 494, 495, Seminar; 493, Research; and 499, Thesis Research (used for zero-credit registration during completion of thesis). Courses based primarily on lecture, conference, and laboratory (i.e., excluding seminar and research courses) are called *formal.* Courses for the various departments may be distinguished by code letters preceding course numbers as follows:

AN	(Anatomy)
BE	(Bioengineering)
BC	(Biological Chemistry)
BP	(Biology/Experimental Pathology)
GC	(Graduate College)
DH	(Histology)
MP	(Medical Psychology)
MC	(Medicinal Chemistry)
MI	(Microbiology)
NU or NL	(Nursing Sciences)
OS	(Oral and Maxillofacial Surgery)
OP	(Oral Pathology)
RD	(Orthodontics)
RS	(Orthopedic Surgery)
PA	(Pathology)
PE	(Pedodontics)
PP	(Pharmacognosy/Pharmacology)
PL	(Pharmacology)
PM	(Pharmacy)
PY	(Physiology)
H-	(Public Health Sciences)
RA	(Radiology)
SU	(Surgery)

III-7.1. The designation "even years" or "odd years" applied to course offerings refers to the calendar year in which the quarter occurs.

III-8. Graduate Study by Academic or Nonacademic Members of the Staff. Employees whose department head or director requests that they take a course to improve their potential for service to the University may register for those courses as auditors without formal credit toward a degree. Nonacademic employees may undertake graduate courses for credit provided Graduate College admission requirements are met. It is necessary to have approval of the employing department and of the Personnel Services Office on a form available from the Training and Staff Development Section, Room 163, DMP Building. Assistants, research assistants, residents, interns, and others on the University staff who undertake graduate study may not be able to carry so full a course program as those who devote full time to their graduate work. Where the number of hours of employment makes it difficult for the student to do justice to a full course load of 16 quarter hours per quarter, it may be better for the student to register for a lighter course schedule. (See section III-8.1.) Such arrangements are subject to departmental approval.

III-8.1. Registration Loads and Terms of Employment. Assistants are permitted to register for up to 16 quarter hours per quarter. However, it is advisable for students, in consultation with their departments, to carry course loads consonant with the demands of employment, and which are not so heavy as to prove detrimental. Suggested schedules: one-quarter time employment or less, 16 quarter hours; half-time, 12 to 16 quarter hours; two-thirds time, 9 to 13 quarter hours; three-quarters time, 8 to 11 quarter hours; full time, 4 to 6 quarter hours. Nonacademic employees pursuing graduate study should be similarly guided by these suggested schedules. However, under the Employee Educational Policy provisions, fee and tuition waiver benefits are limited to one or two courses, depending upon percentage of time worked by the employee. See section VII-3.1(f).

III-8.2. Services of Assistants. The services of assistants encompass direct and indirect support of research and teaching, the amount of service being proportional to the percent time of employment; 19 hours per week are expected of half-time assistants.

III-8.3. Restriction on Graduate Work for Academic Staff Members. No person is admitted to candidacy for an advanced degree on a campus of the University if he holds an appointment as professor, associate professor, or assistant professor in any department or division of that campus of the University. Any person engaged in graduate study who accepts an appointment with the rank of assistant professor or higher at a campus of the University will be dropped as a degree candidate on that campus. In the case of intercampus graduate programs, no one is admitted to candidacy for an advanced degree if he holds the appointments noted in any one of the cooperating campuses of the University.

III-9. Time for Completion of Degrees. A full-time graduate student is expected to complete all work for the M.S. degree within one or, as some curricula may warrant, two years; for the Ph.D. degree, within four years. Programs should be carefully planned to this end. A part-time student may take longer, except as restricted by III-9.1.

III-9.1. A candidate for the M.S. degree must complete all requirements for the degree within five calendar years after first registration in the Graduate College; a candidate for the Ph.D. degree must complete all requirements within seven calendar years after first registration in the Graduate College, except as noted in III-9.2.

III-9.2. A candidate for the Ph.D. degree who has received a master's degree elsewhere must complete all requirements for the degree within five calendar years after first registration in the Graduate College. A student whose program of study is significantly interrupted after receiving a master's degree from the University of Illinois and who later returns to work for the doctorate will have five calendar years from the date of return to complete degree requirements.

III-10. Grades, Probation, and Disqualification for Further Study. Grades are recorded as A, B, C, D, and E. E indicates failure. C or D indicates unsatisfactory though passing work.

M.S. Program: A student at the master's level may receive 5 quarter hours of C or D without penalty, that is, without losing credit. (Grades of E carry no credit.) If additional hours below B are received, these additional hours are not counted and they must be replaced with A or B grades in the same or equivalent courses, that is, of the same number level (300 or 400) and the same character (formal, seminar, or research), as approved by the adviser. A student is automatically placed on probation when 10 quarter hours below B have been acquired (such status appears on the transcript of record). When the "additional hours below B" have been made up with grades of A or B, probation is lifted. A total of 16 quarter hours of grades below B disqualifies a student for further graduate work.

Ph.D. Program: The above rules for the M.S. program obtain except that, in pursuit of formal courses toward the doctorate, a grade of C in formal course requirements is validated for credit by a grade of A in a formal course of equivalent credit. A total of 16 quarter hours of uncompensated grades below B disqualifies a student for further graduate work.

III-10.1. Deferred Grades. A deferred grade indicates that the student has not completed work in the course for some justifiable reason. Subsequent registration may be reduced until the deferred grade is removed. A grade may not be deferred beyond the end of the quarter following that in which the course is given; after that time a grade of E will be given for the course. In the case of a course which continues for two or more quarters, the grade may be deferred until the end of the second or third quarter, but not later than the end of the quarter following the last quarter.

III-11. Attendance at Commencement. Candidates for graduate degrees are expected to attend commencement exercises at the end of the spring quarter.

III-12. Advisers. Every graduate student must have an adviser (a major adviser) assigned following consultation within the department. This adviser, who must be a member of the Graduate College faculty, has a primary duty to assist the student in planning and carrying through a program of graduate work which fits the needs and desires of the student, and at the same time satisfies departmental and Graduate College requirements. The major adviser usually serves as supervisor of the student's research project. If this is not feasible, he may delegate supervision of the student's research to a thesis adviser who need not be a member of the graduate faculty.

III-13. Completion of Degree Requirements. Students finishing their graduate studies, but who have not completed all University requirements for their degree prior to the first day of instruction of a quarter, must enroll and pay the appropriate fees for the quarter.

IV Intercampus and Special Programs

IV-1. CIC Traveling Scholar Program. The University of Illinois is a member of the Committee on Institutional Cooperation (CIC), a voluntary association of Big Ten universities and the University of Chicago, and participates in its Traveling Scholar Program. This enables a doctoral student to spend a maximum of two semesters or three quarters at another CIC institution to enjoy the advantage of special courses or facilities not available at the home institution. (The University of Chicago allows up to two academic quarters without requiring registration and payment of regular tuition and fees.)

IV-1.1. Admission to the CIC Program:

(a) The student consults with his or her adviser, who determines the probable value to the student of the off-campus opportunity and that it is not duplicated on campus.
(b) The adviser then consults with the counterpart faculty member at the prospective host institution.
(c) On agreement of the adviser and the host faculty member, the student initiates the form Application for Admission to the CIC Graduate Exchange Program, obtainable from the Graduate College Office. The student's credentials are then sent to the traveling scholar liaison officers at both institutions.
(d) If both liaison officers approve, the student is notified of his acceptance by the dean of the Graduate College, who is the liaison officer for the University of Illinois at the Medical Center.

IV-1.2. The traveling scholar registers, pays fees, and receives credit at the home university; the host institution provides health and medical services as for its own students.

IV-2. Concurrent Registration. Students may register concurrently at the Chicago Circle or Urbana campuses of the University of Illinois with the signed approval of the major adviser, the instructor of the course, and the Graduate College.

IV-3. Courses Taken at Other Institutions. As part of an approved program of the Graduate College of the University of Illinois at the Medical Center, students may register for courses at other institutions than those noted in IV-1 or -2, upon recommendation of the major adviser and the department head, and with approval of the dean of the Graduate College. When courses are completed, the proper credit is accepted and recorded upon the receipt of the transcript.

IV-4. Intercampus Bioengineering. The Ph.D. in bioengineering is a joint interdisciplinary program between the graduate colleges at the Medical Center and Chicago Circle campuses. It is designed to accept students with backgrounds in either engineering or life sciences including medicine, and is designed so that the student will receive substantial experience in both of these disciplines. See under Bioengineering (Intercampus) in the Departments section. When applying, specify the degree sought as "Ph.D. — Intercampus Bioengineering." Details may be obtained by writing to:

Program Head, Bioengineering
College of Engineering
University of Illinois at Chicago Circle
P.O. Box 4348
Chicago, Illinois 60680

IV-4.1. Intercampus Biology and Experimental Pathology. The Ph.D. in biology and experimental pathology is a joint interdisciplinary program between the graduate colleges at the Medical Center and Chicago Circle campuses. It is designed to provide well-qualified students with a broad understanding of the life sciences as a whole with intense training in areas of specialization, including evolutionary and environmental biology, regulatory biology, and experimental pathology. The program is administered by an Intercampus Governing Committee. Applicants for admission may enter through the Graduate College at the Medical Center, or through the Graduate College at Chicago Circle, in accord with admissions standards prevailing at that campus. When applying, specify the degree sought as "Ph.D. — Intercampus Biology and Experimental Pathology." Details may be obtained by writing to the Dean of the Graduate College at either campus. (For addresses see section I-1.1.)

This doctoral program is separate from the pathology major which students enrolled for the Ph.D. in the Department of Pathology may take and which is described under the departmental heading "pathology."

IV-5. Public Health and Public Health Education. This joint program provides the opportunity for M.S. and Ph.D. degree candidates in the Department of Health and Safety Education at Urbana-Champaign to take part of their course work at the School of Public Health at the Medical Center. This intercampus relationship permits increased emphasis on community aspects of health education as related to both traditional and emerging public health programs.

Students wishing to undertake study of this type must file a Student Application for Intercampus Graduate Program (IGP), available in Graduate College and departmental offices. A document entitled "Procedures for Student Participation in an Intercampus Graduate Program (IGP)" is also available in the Graduate College Office. It provides information relating to application for the program, registration, change of campus by the participant in the program, student records, and transcripts. Details may be obtained by writing to:

Department Head
Department of Health and Safety Education
University of Illinois at Urbana-Champaign
Champaign, Illinois 61820

IV-6. Combined Professional-Graduate Degree Programs. Graduate degrees represent tangible evidence of research training and are important symbols for lifetime reference. A combined professional-graduate degree program is available leading to M.D. or D.D.S. and M.S. degrees which may be completed within the four-year period following matriculation in the professional college. Additional advanced credit may also be earned to apply toward the Ph.D. which may be completed after the professional degree is awarded, or before it is awarded, if a year is taken out of professional training and devoted to full-time graduate work.

IV-6.1. Interested medical or dental students are urged to consider the professional-graduate program. Many have found it a rewarding experience and an advantage in consideration of future academic or research positions. Specialty Boards may also give credit toward certification in a professional specialty for graduate-level study, thus reducing the time required for certification as a specialist.

IV-6.2. Because the medical or dental student acquires a broad basic science background in anatomy, biological chemistry, microbiology, pharmacology, physiology, and pathology during the pursuit of formal course work in the professional curriculum, only a minimal addition of formal graduate courses is required. For a master's degree as few as 5 quarter hours of formal course work (usually one or two courses) in the 400 series may be sufficient in any one of the above-mentioned basic science areas and the remaining 43 quarter hours may be in seminars, collateral courses, and research. This means that up to 11 quarter hours in formal collateral courses may be granted for medical or dental courses so approved by the major adviser. This section applies also to holders of the D.D.S. or M.D.

IV-6.3. For the Ph.D. degree, 16 quarter hours of 400-level formal courses are required and the remaining 128 hours may be earned in seminars, electives, and research. A student may pursue a degree in a basic science and develop his research and thesis under an adviser in the clinical departments. The thesis, however, must be basic-science–oriented.

IV-6.4. Professional students are generally exempt from Graduate College tuition and fees. (See section VII-3.1(h).) Registration for a full program of 16 quarter hours during a free quarter (vacation, alternate quarter program) and 6 quarter hours per quarter simultaneously with a full professional curriculum is permitted, with approval of the dean of the professional college concerned. By using all opportunities with a full professional curriculum, a student may complete more than 100 quarter hours toward the total of 144 quarter hours required for the Ph.D. degree by the time the professional degree is completed. In such a case, the combined degrees can be obtained within five years. Selected students of high scholastic attainment may be eligible for waivers of tuition in both professional and graduate colleges, and in some instances, fellowships or assistantship stipends may be available as well.

IV-6.5. After preliminary discussions with the department in which graduate studies are contemplated, the professional student should apply for admission to the Graduate College in the usual manner, and submit a program proposal for the Ph.D. degree for the approval of the dean of the Graduate College.

V The Degree of Master of Science

V-1. The master's degree is awarded in recognition of the successful completion of substantial postbaccalaureate study in a chosen field in preparation for scholarly and professional activities. It may be a terminal degree or it may be a course of study and research designed to serve as the foundation for a more advanced scholarly undertaking leading to the Ph.D. degree. The M.S. program should involve research culminating in a satisfactory thesis.

V-2. Study Program — Minimum Requirements for the M.S. Degree.*

Formal Courses	
In 400 series	5 quarter hours
In collateral courses	11 quarter hours
Research	10 quarter hours
Seminars and electives	22 quarter hours
Total	48 quarter hours

An acceptable thesis

Pass a final oral examination

V-3. Residence. Each candidate for the M.S. degree must spend time in residence defined by study at the Medical Center campus for at least three calendar quarters and at least 24 quarter hours in regularly scheduled courses. (See also section II-6.3.)

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* Public Health Sciences requires 72 quarter hours.

V-4. Thesis. A candidate for a master's degree must submit a thesis on a subject approved by the professor supervising his work. Such approval must be secured and the subject of the thesis filed at the Graduate College Office at the time the final examining committee is proposed.

V-5. Thesis Work in Absentia. A student may be permitted to complete the last 10 quarter hours of work, if devoted to the thesis, under leave of absence. In order to do so, the student must have accumulated at least 38 quarter hours in residence, must submit an outline of the proposed investigation approved by the head of his major department, and must provide satisfactory evidence that adequate facilities are available where the proposed work is to be done. If the arrangement is approved by the dean, the student must register, pay tuition and fees, and communicate with the adviser at frequent intervals concerning progress. A student who has completed all course requirements may be granted official leave to work on his thesis but must return and pay fees in the final quarter; or the student may register for zero credit in -499 (Thesis Research) as may be approved by his adviser.

V-6. Thesis Preparation. A booklet of instructions for the preparation and form of the thesis is available at the Graduate College Office. The thesis may be submitted at any time during the year; however, candidates who expect to receive a degree at a particular time must meet the related deadline (see calendar).

V-7. Final Examination. After deposit of the thesis in the Graduate College Office a committee appointed by the dean examines the thesis and determines by oral examination the candidate's knowledge in the chosen field of study. Degrees are conferred at the end of each quarter, with commencement exercises in the spring quarter. Candidates must be recommended to the dean for the degrees indicated at least three weeks before the date set for the conferral (see calendar).

V-8. Second Master's Degree. A graduate student who holds a master's degree from the University of Illinois or from another accredited institution and who desires to become a candidate for a second, different master's degree from the University of Illinois may do so upon satisfactory completion of at least 35 quarter hours of work beyond those submitted in partial fulfillment of the requirement for the first master's degree, of which 20 must be in the major field; and with the acceptance, by petition, of up to 10 quarter hours which were completed in partial fulfillment of the requirements of the first master's degree.

VI The Degree of Doctor of Philosophy

VI-1. Admission. Students desiring admission to graduate study for the Ph.D. degree may initially enroll with the department of their choice either for the M.S. or the Ph.D. After completion of the M.S. degree, or satisfactory completion of 48 quarter hours of graduate study, students may be eligible to formally pursue a program toward the Ph.D. degree. Before registration of the student for work toward the degree, a qualifying committee composed of the student's major adviser as chairman and two additional members of the graduate faculty chosen by the major adviser or the department head, will arrange an interview with the student to outline a program of formal courses, seminars, and other requirements in an integrated whole relevant to the objectives of the student and his major adviser. The program as outlined shall be recorded in the Graduate College Office and is subject to alteration at the discretion of the departmental committee. A student who petitions to bypass the M.S. degree must have met the departmental requirements and must be in good standing in the Graduate College.

VI-1.1. A student who enrolls directly for the Ph.D. degree arranges with the committee described in VI-1 to prepare a program proposal for the Ph.D. degree. This should be submitted to the Graduate College Office prior to registration for the second quarter, if possible, and must be submitted before registration for the fifth quarter.

VI-1.2. In the case of students who receive the M.S. degree from a department of the Graduate College and later decide to seek the Ph.D., a new application must be completed, an application fee paid, and approvals by the graduate department and the dean must be secured. Procedures for students with or expecting a degree of Master of Science, who wish to continue with doctoral study are given in the *Graduate College Handbook,* section 23.2.

VI-2. Study Program — Minimum Requirements for the Ph.D. Degree

Formal 400 series courses	
In major discipline	10 quarter hours
In collateral area	6 quarter hours
Research, seminars, and electives	128 quarter hours
Total	144 quarter hours

Pass an oral preliminary examination

An acceptable thesis

Ordinarily a student may not register for more than a total of 50 quarter hours of formal courses.

VI-3. Registration in Basic Medical Sciences Courses. Upon recommendation of the major adviser, made to the dean, a student may pursue, without credit, basic science courses not specifically required in the Ph.D. program. Grades obtained in such courses are not prejudicial to the student's standing in the Graduate College. However, unsatisfactory grades may be detrimental to the student's general progress and standing. The privilege of registering for such basic science courses will be withdrawn if it appears that the student's intent is to meet the requirements of the professional curriculum thereby. Registration is not allowed for more than one such course each quarter.

VI-4. Foreign Language Requirements. The Graduate College does not have a foreign language requirement. When an individual department has such a requirement, however, the student should make appropriate arrangements to satisfy it. Administration of these requirements rests entirely with the departments.

VI-5. Period of Study. Ordinarily it is expected that graduate students holding fellowships or half-time assistantships will carry a full course load each quarter. In this way a student should expect to complete all requirements for the Ph.D. degree within four years. Students holding premium stipends may expect such financial support contingent upon good scholastic standing, for a maximum of four years. (See also section III-9.)

VI-6. Residence. Each candidate for the Ph.D. degree must spend time in residence defined by study at the Medical Center campus for at least three consecutive quarters of at least 8 quarter hours per quarter. Not less than 96 quarter hours must be earned at the University of Illinois. (See also section II-6.3.)

VI-7. Continuous Registration. After passing the preliminary examination, candidates register for at least one quarter hour each quarter until the thesis is completed or the minimum quarter hour requirement of 144 has been met, whichever comes first. If the 144 quarter hour requirement is fulfilled before the thesis is completed, the candidate, in absentia or otherwise, may register in -499 (Thesis Research) for zero credit; if the thesis is completed before the quarter hour requirement is fulfilled, the unfulfilled quarter hours (research/thesis) may be waived. Failure to sustain continuous registration (including zero credit registration) without having been granted official leave in lieu thereof is regarded as abandonment of graduate studies, equivalent to resignation from the program.

VI-8. Preliminary Examinations. In order to become a candidate for the Ph.D. degree the student must pass a preliminary examination intended to test his knowledge of the major and collateral fields of study. The student is eligible to take the examination when he or she has (a) satisfactorily completed all of the formal nonresearch courses prescribed by the qualifying committee, and (b) had the adviser inform the dean that he or she is adequately prepared.

VI-8.1. The examination extends to the student's whole field of study. It is not confined to specific courses taken in this or other universities, but is conducted to determine whether the student has mastered a definite field of knowledge and is able to evaluate its potentialities and opportunities for further advances; this examination is not intended to treat the student's research interests. The student must also satisfy the committee that he or she is able to integrate the field of specialization with larger domains of knowledge and understanding. The examination is oral, but may have a written component preceding, in accord with departmental policy.

VI-8.2. The student must complete at least two quarters of residence (32 quarter hours) between the preliminary examination and the completion of work for the doctorate.

VI-9. Thesis. The capacity for independent research should be shown by the production of an original thesis on some topic connected with the major field of study. The candidate is expected to defend the thesis or dissertation before the members of the faculty, or as many of them as may wish to question him or her about it in connection with the final examination or ceremonial seminar. (See section VI-10.1.) The subject of the thesis should be chosen and the title submitted to the Graduate College Office at the time the final examining committee is proposed.

VI-9.1. Thesis Preparation. See section V-6.

VI-10. Final Examination. At least three weeks before the time the degree is to be conferred, the candidate may take a final examination given by a committee appointed by the dean. This examination deals primarily with the research work of the student, as embodied in the thesis, and is conducted chiefly to determine if the candidate has demonstrated the capacity to conduct original and scholarly investigations in the field of his or her choice.

VI-10.1. The student and department may elect to forego the customary final Ph.D. examination and substitute in its place an open departmental seminar at which one or more candidates will present the results of their investigations. In addition to the members of the thesis committee who attend, faculty members from other departments, graduate students, and other interested parties may attend. A seminar of this type takes the nature of a ceremonial event rather than an examination in the usual sense, although the candidates may expect critical interrogation by members of the audience. Members of the final examination committee who approve the thesis may sign for it before or after the seminar.

VII Tuition and Fees

VII-1. Students registering for graduate work pay fees, which are subject to change without notice, according to the following schedule:

	FULL PROGRAM		PARTIAL PROGRAMS				
	Range I		Range II		Range III		Range IV
	12 quarter hours and above		Above 5 but less than 12 quarter hours		Above 0 through 5 quarter hours		0 credit only
	Resident	*Non-resident*	*Resident*	*Non-resident*	*Resident*	*Non-resident*	*Resident and Non-resident*
Tuition (except those holding exemptions)	$165	$495	$113	$333	$ 62	$172	$31
Service fee	67	67	47	47	27	27	13
Hospital-medical-surgical fee	21	21	21	21	21	21	21
Total	$253	$583	$181	$401	$110	$220	$65

VII-1.1. Special Fees.

Late registration fee. Former students who register after the regular registration days are subject to this fee	$15
Visitor's fee, per course	$15
Special examination fee. This fee is charged for any special examination given in a course which has been failed	$10
Transcript fee. Each student who has paid all other University fees is entitled to receive, without charge, one transcript of record. For each additional transcript this fee is charged	$1

VII-1.2. Service Charge for Deferred Fees. Tuition and fees for each quarter may be paid in installments. Students electing this plan are assessed a service charge.

VII-2. Assessments. Tuition and fees are assessed all students, as applicable. The nonresident tuition fee is assessed against those students who are defined as nonresidents of Illinois under *Regulations Governing the Determination of Residency Status for Admission and Assessment of Student Tuition.*

VII-2.1. For fee assessment purposes, a staff appointment must require service for not less than three-fourths of the academic term, defined as the period between the first day of registration and the last day of final examinations. Staff tuition and fees privileges do not apply to students employed on an hourly basis in either an academic or nonacademic capacity, or to persons on leave without pay.

VII-2.2. University employees appointed to established civil service positions whose rates of pay are determined by negotiation, prevailing rates, and union affiliation are not considered as paid on an hourly basis and are entitled to the same tuition and fee privileges accorded to other staff members under the regulations.

VII-2.3. Any student who resigns his staff appointment, or whose appointment is cancelled before rendering service for at least nine weeks of the term, becomes subject to the full amount of the appropriate tuition and fees for that term, unless he withdraws from his University classes at the same time the appointment becomes void. Such a student is not assessed tuition and fees for that term if he files clearance for graduation within one week after the appointment becomes void.

VII-3. Exemptions. CIC traveling scholars from other collegiate institutions pay appropriate tuition and fees at their home institutions; they pay no tuition or fees for their work on this campus. Other students may be exempted from one or more of the usual charges if they qualify under the conditions listed below.

VII-3.1. Tuition Is Waived for:

(a) Holders of tuition waiver scholarships.

(b) All academic employees of the University on appointment for at least 25 percent, but not more than 67 percent, of full-time service.

(c) Holders of graduate tuition and fees waivers awarded by the Graduate College.

(d) University employees registered at the request of their departments in zero-credit courses especially established to improve the work of the employee.

(e) Academic staff members emeriti.

(f) Nonacademic employees of the University in status appointments, or in appointments designed to qualify for status in an established class. Tuition waivers are limited to two courses in a quarter if the employee is on a full-time appointment; four quarter hours if on an appointment three-quarter time or more, but less than full time; and three quarter hours if on an appointment half time or more, but less than three-quarter time. The Employee Educational Policy also provides for waiver of the audit fee on the same basis in cases where nonacademic employees are auditing graduate courses.

(g) Dental and medical residents in the University of Illinois Hospital.

(h) Dental, medical, nursing, pharmacy, and public health students registered concurrently for part-time graduate study.

VII-3.2. Service Fee Is Waived for:

(a) All those exempt from tuition under VII-3.1 (b-h).

(b) Students registered in absentia.

VII-3.3. Hospital-Medical-Surgical Fee Is Waived for:

(a) Persons registered for doctoral thesis in absentia.

(b) Students presenting evidence of equivalent coverage upon approval of a petition presented to the University Insurance Office not later than the final day established for a full refund of fees. (See section VII-4.b-1.)

(c) University employees, who have equivalent coverage.

VII-3.4. Summer Session Tuition and Fees Are Waived as Follows: Students holding academic appointments to the close of the final term of an academic year either as employees or fellows, and for whom tuition and/or fees have been provided through waiver or through cash payment by an outside agency, are entitled to a waiver of the same kinds of tuition and fees for the summer session immediately following, provided they hold no appointments during that summer session.

VII-4. Refunds.

(a) *Cancellation of Registration.* A continuing student who pays tuition and fees for any term and who subsequently cancels his registration prior to the first day of classes of that term shall be refunded the full amount of his payment, including the usually nonrefundable charge.

(b) *Withdrawal.* A student subject to tuition and/or fees who files clearance for withdrawal from the University during any term for reasons other than military, receives refunds as follows:

  (1) During the first ten days in the quarter, refund is made of the full amount of the tuition and fees assessed except for a nonrefundable charge of $31. When the total assessment has been less than $31, the full amount of the assessment, if any, is nonrefundable.

  (2) After the first ten days no refund is made.

VIII Financial Assistance

VIII-1. Various types of financial assistance are available to promising graduate students. Students in doctoral and some master's programs are eligible on a competitive basis for stipends (assistantships, fellowships) ranging from $1,700 to $5,500 per year in addition to waivers of, or exemptions from, tuition and most fees. Graduate students who hold fellowships, traineeships, or tuition waivers must carry full-time course loads; excepted are those registered in -499 Thesis Research for zero credit who are on campus devoting full time to their research or thesis preparation. See section III-4(e).

VIII-1.1. The principal kinds of awards are: teaching assistantships, research assistantships, and a variety of fellowships (Graduate College, industrial, endowed, and federally sponsored). Merit Award Teaching Fellowships

(MATF) and Merit Award Research Fellowships (MARF) are available to selected graduate students of skill and great promise as teachers and investigators. Details and conditions of appointment may be obtained from the major adviser and from the *Graduate College Handbook*. Fellowships are income tax free.

VIII-1.2. Specific financial arrangements are usually made directly with the department, where funds are available, subject to the approval of the Graduate College.

VIII-2. Loans. Loan funds have been established for the benefit of worthy students who need financial assistance. The University of Illinois participates in the Student Loan Program under the National Direct Education Act. Financial aid information and application forms are available by writing or calling:

Financial Aid Section
Office of Student Affairs
University of Illinois at the Medical Center
P.O. Box 6998
Chicago, Illinois 60680
Telephone: (312) 996-4940

Grants, student loans, and part-time employment are administered by this office. Awards are based upon demonstrated financial need rather than academic performance or test scores. Applicants are encouraged to submit financial aid forms early, although no aid decision will be made until admission is approved.

VIII-3. Military Scholarships. Acts of the General Assembly of Illinois provide scholarships for veterans of the armed forces. These scholarships exempt the holders from tuition only. Applicants must have:

(a) been residents of Illinois at the time of induction into the armed service;
(b) served one year on active duty;
(c) been honorably discharged;
(d) returned to Illinois within six months of discharge.

For detailed information and applications, contact: Financial Aid Section (see address in section VIII-2.).

IX Facilities and Services

IX-1. The Research Resources Center, an arm of the Graduate College, supports research and graduate education. It has seven sections:

(a) **The Biologic Resources Laboratory** is one of the largest and best-equipped animal research facilities in the nation. The laboratory has fifty-two small animal and thirty large animal rooms, as well as diagnostic and therapeutic x-ray and whole body cobalt irradiation rooms. The modern surgical facility can accommodate fifteen operations simultaneously.

(b) **The Electron Microscope Laboratory** contains seven electron microscopes and maintains educational and service programs which are available to investigators at the Medical Center.

(c) **The Bioinstrumentation Laboratory** provides electronic instrument design, construction, and service in addition to maintenance and repair activities for electronic equipment at the Medical Center.

(d) **The Environmental Stress Laboratory** consists of altitude chambers and rooms with a wide variety of temperature, humidity, and pressure control.

(e) **The Nuclear Magnetic Resonance Laboratory** maintains a computerized high field (90 MHz) high resolution NMR spectrometer and ancillary equipment for the purpose of determining molecular structures and molecular interactions in materials of biomedical importance.

(f) **The Instrument Shop Laboratory** maintains equipment for construction of special apparatus, primarily for use in research, particularly if such equipment is not available on the commercial market.

(g) **The Central Equipment Division** is being planned as a supply and repair depot for research equipment, in order to maintain an extensive inventory of such material on campus. It will serve to maximize the usefulness and usability of equipment at the lowest cost to scientific investigators.

IX-2. The Health Sciences Computer Center contains an IBM 370/155 Processing Unit with a million bytes of core and peripherals including disks, tapes, x-y plotter, printer, IBM 1800 analog-digital computer, and two Tempo minicomputers to handle teleprocessing. The system is oriented to both batch and teleprocessing modes of operation supporting approximately seventy-five interactive video and hard copy remote terminals. The system contains user-oriented conversational interreactive languages including educational programs in the health sciences and is connected to users on a national scale through TYMSHARE. The system supports software packages for a variety of complex statistical methods as well as routine operational procedures.

IX-3. The Drug and Horticultural Experimental Station, located in suburban Lisle, provides a unique opportunity for research on drug plants.

IX-4. The Library of the Health Sciences serves all the colleges and schools of the University of Illinois at the Medical Center, as well as the University Hospital and affiliated institutions in Chicago. Its collection is a comprehensive one of materials in all the fields of interest in the Medical Center. Over 3,200 current periodicals are received and more than 279,000 books, bound periodicals, and multimedia items are available. The library is a member of the SUNY Biomedical Communication Network, which provides access to the MEDLINE, ERIC, Psychological Abstracts, and BIOSIS data files. In addition the library is part of the MEDLINE network which provides access to the TOXLINE data base. All of these are online computer information retrieval systems for searching the international health science literature. The library's facilities are available for reference use and a professional staff of twenty-four is on hand to assist. Most library materials circulate; a photocopy service, both mediated and self-service, is available at nominal cost.

IX-4.1. The Library of the Health Sciences is one of the designated resource libraries under the program of the Midwest Regional Medical Library. A monthly newsletter is published containing a list of current acquisitions as well as an annual union list of serials, giving library holdings and locations for all serials. A free Library Guide is available which contains information about services and library policies.

IX-4.2. The library collections of the University of Illinois at Chicago Circle are available and easily accessible to the Medical Center, as well as those of other libraries and institutions in the Chicago area.

IX-5. Museums. The Colleges of Dentistry, Medicine, and Pharmacy each have museums with exhibits of specimens and collections pertinent to the field which are useful for study and demonstration in the respective areas.

IX-5.1. The Field Museum of Natural History and the Museum of Science and Industry are additional sources of information for study within Chicago.

IX-6. Housing. The University offers comfortable and convenient living quarters on the campus at reasonable rates in its residence halls and its Staff Apartment Building. There are 145 units in the latter. Priority in their assignment is given to faculty, nonacademic staff, residents, and interns who are employed by the University at least on a half-time basis. Married students, graduate students, and others are also eligible on a space-available basis. If a married student's spouse is employed by the University at least on a half-time basis, the couple is eligible for employee priority on the waiting list.

IX-6.1. The Student Residence Hall and Women's Residence Hall jointly accommodate 589 students, primarily in double study-bedrooms. There is a ten-meal per week modified form of contract meal service (students eat any two meals each day, Monday through Friday, under the contract plan and are free to eat on a cash basis at other times). The residence halls are interconnected and join the Chicago Illini Union, forming an integrated, three-building service complex, which provides a wide range of facilities, services, and programs to the residents. Included are lounges, dining facilities, a twenty-four-hour vending snack bar, bowling lanes, billiards and table tennis, music and art display rooms, a bookstore, a barber shop, a travel agency, a staff of resident counselors, residence halls student government programs, and study facilities.

IX-6.2. Additional information and application forms for both the apartments and residence halls may be obtained from:

Housing Office
University of Illinois at the Medical Center
818 South Wolcott Street
Chicago, Illinois 60612
(312) 996-7020

The Departments

ANATOMY

The goal of graduate training in anatomy is to develop research scholars who are prepared to engage in creative work in some field of morphological or experimental biology and to train competent teachers in the morphologically oriented sciences. The fields of study open to a graduate student are: functional and evolutionary morphology, cell structure and function, developmental biology, immunobiology, endocrinology, and neurobiology. Students interested in functional and evolutionary morphology may utilize the facilities and take courses in the Center for Graduate Studies at the Field Museum of Natural History.

Preference for admission is given to students who intend to complete a doctoral program.

All entering students are expected to complete AN-303, AN-340, AN-341, AN-342, and AN-343. All graduate students are required to serve as laboratory teaching assistants each year as part of their degree training program.

Graduate Faculty

Professors: E. Lloyd DuBrul,* Arthur LaVelle, Helen C. Maibenco,* Edward Polley, Keen A. Rafferty, Jr., W. Ann Reynolds, Anthony J. Schmidt,* Pierson J. Van Alten, Ralph M. Wynn.*

Associate Professors: Herbert R. Barghusen, Louis A. Benevento, Robert E. Kelly, Marten M. Kernis,* Robert P. Scapino.*

Assistant Professors: Conwell Anderson, James Colgan, Joel L. Cracraft, Susan W. Herring,* Marlene Lazarus, Howard G. Sachs.

Participating Staff

Professors: Robert H. Krehbiel, Harry Monsen.

Visiting Assistant Professor: William A. Clark.

Instructors: Nancy Kinderman, Gregory Stanton.

AN-303. Human Neuroanatomy. W or Sp. 5 qh. LaVelle.

AN-304. Gross Anatomy — Biomechanics of Head and Neck. W. 4 qh. Barghusen.

AN-305. Gross Anatomy — Biomechanics of Head and Neck. Sp. 6 qh. Barghusen.

AN-320. Medical Gross Anatomy.† F. 2 qh. Monsen.

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* Affiliate.

† Medical course listings require completion of consecutive quarters and final comprehensive examination for credit evaluation.

AN-321. Medical Gross Anatomy.† W. 2 qh. Monsen.
AN-322. Medical Gross Anatomy.† Sp. 2 qh. Monsen.
AN-325. Medical Histology.† F. 2 qh. Reynolds.
AN-326. Medical Histology.† W. 1 qh. Reynolds.
AN-327. Medical Histology.† Sp. 1 qh. Reynolds.
AN-330. Medical Neuroanatomy.† W. 1 qh. Polley.
AN-331. Medical Neuroanatomy.† Sp. 2 qh. Polley.
AN-340. Gross Human Anatomy. F. 5 qh. Kelly.
AN-341. Gross Human Anatomy. W. 5 qh. Kelly.
AN-342. Cell Structure and Human Histology. F. 4 qh. Van Alten.
AN-350. Advanced Anatomy. F, W, Sp, Su. 1 to 3 qh. Van Alten.
AN-360. Morphology of Pelvic Structures. F. 3 qh. Krehbiel.
AN-412. Functional Cytology. W. 4 qh. Sachs.
AN-413. Functional Analysis of Cultured Cells. Sp. 5 qh. Rafferty.
AN-420. Concepts of Synaptic Function and Morphology. F. 2 qh. Polley.
AN-421. Approaches and Methods in Anatomical Research. F, W. 2 qh. Lazarus.
AN-431. Experimental Neurocytogenesis. F. 3 qh. LaVelle.
AN-434. Developmental Immunobiology. W. 3 qh. Van Alten.
AN-435. Morphologic and Physiologic Adaptations to Growth, Aging, and Injury. Sp. 3 qh. Maibenco.
AN-436. Evolution of Functional Complexes in Vertebrates. Sp. 4 qh. Barghusen.
AN-440. Special Topics in Anatomy. (Consult department for subtitle.) F, W, Sp, Su. 2 to 3 qh. Staff.
AN-441. Special Topics in Anatomy: Fetal Anatomy. Sp. 3 qh. Krehbiel.
AN-442. Special Topics in Anatomy: Evolutionary Morphology. W or Sp. 3 qh. Cracraft.
AN-443. Special Topics in Anatomy: Human Embryology. Sp. 3 qh. Krehbiel.
AN-454. Neuroendocrinology. F. 3 qh. Anderson.
AN-455. Brain Mechanisms. (even years). 2 qh. Benevento.
AN-491. Seminar and Journal Club. F, W, Sp. 0 to 2 qh. Staff.
AN-493. Research in Anatomy. F, W, Sp, Su. 1 to 16 qh. Staff.

BIOENGINEERING (Intercampus)

The Intercampus Bioengineering Program offers work leading to the Doctor of Philosophy degree. It is designed primarily for students with degrees in physical sciences, engineering, mathematics, biology, or medicine. Students from other areas will be encouraged to apply if their backgrounds indicate a reasonable chance of success in the program.

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† Medical course listings require completion of consecutive quarters and final comprehensive examination for credit evaluation.

Bioengineering trains the student to apply engineering concepts and methods to the life sciences and medicine and to conduct research that will develop systems that apply modern technology to problems of living systems and health care. It includes the application to living systems of the principles of information processing, communication and control theory; cybernetics, artificial intelligence and pattern recognition; bioinstrumentation, prostheses and artificial organs; and some aspects of biophysics. Students from the life sciences are expected to emphasize mathematics, engineering, and physical sciences in their initial course work; students from the physical sciences are expected to concentrate initially on the life sciences.

The Doctor of Philosophy in Bioengineering is jointly administered by the College of Engineering at the University of Illinois at Chicago Circle and the University of Illinois at the Medical Center through the Intercampus Bioengineering Coordinating Committee. Applicants for admission to this program enter one Graduate College, either at the Medical Center or at the Chicago Circle campus, in accord with admission standards prevailing at that campus. GRE scores, including advanced in field of previous degree, are required.

Since students may enter the program from a variety of disciplines, some will have deficiencies in a number of areas. To remove deficiencies in prerequisites or background requirements, the student may be required to take undergraduate or specialized remedial courses, chosen in consultation with the adviser. Otherwise, the program in bioengineering requires 144 quarter hours of credit beyond the baccalaureate, consisting of a reasonable distribution of course work between the Chicago Circle and Medical Center campuses.

There are four areas of concentration: health care delivery; medical instrumentation; physiological systems and biocontrol; and prosthetics and artificial organs. The student must complete in one of these areas at least 36 quarter hours of required courses and electives chosen in consultation with the adviser. In addition to these areas of concentration, a student with other interests may design his own area of concentration in consultation with the adviser, subject to approval by his doctoral advisory committee.

Some courses from both campuses are required of all students: at the Medical Center campus, either (a) three of PY-369, PY-370, PY-371, PY-469, PY-470, PY-471, with at least two 300-level courses and at most one associated laboratory; or (b) PY-321 plus a 400-level physiology course; at

Chicago Circle campus, BE-354, BE-379, and BE-497, plus 6-12 quarter hours internship.

Note: Many courses pertinent to the graduate program in bioengineering are offered by other Chicago Circle engineering departments and at the Medical Center. Students should consult the appropriate listings for details.

Graduate Faculty

Professors: Gyan C. Agarwal, Robert C. Arzbaecher, Riad Barmada,* Morton F. Goldberg, Earl E. Gose, Alois R. Hastreiter,* Edward A. Lichter,* Ruy V. Lourenco,* Thaddeus Marczynski,* Bruce H. McCormick, Irving F. Miller, Akira Omachi,* William D. O'Neill, Kenneth M. Rosen,* William Rostoker, Albert Schultz, Arthur H. Wolff,* Bert L. Zuber.

Associate Professors: Lyndon R. Babcock, Jr., Ted B. Belytschko, Joseph C. F. Chow, Sidney Levitsky,* Robert S. Pogrund.*

Assistant Professors: Michael Goldbaum, Gordon L. Humphrey,* Arthur J. Miller,* John L. Semmlow, Richard A. Wadden,* Jacob T. Wilensky.

Participating Staff

Associate Professor: Svante O. Rolander.*
Assistant Professor: Myron J. Evanich.

BE-307. Pattern Recognition I. F. 4 qh. Gose.
BE-341. Man-Machine Systems. Sp. 4 qh. Agarwal.
BE-350. Prostheses and Artificial Organs. W. 4 qh. Miller.
BE-352. Biocontrol. Sp. 3 qh. Zuber.
BE-353. Biocontrol Laboratory. Sp. 3 qh. Semmlow.
BE-354. Bioinstrumentation: transducers. F. 4 qh. Semmlow.
BE-355. Engineering Biophysics. F. 4 qh. Miller.
BE-356. Materials in Bioengineering. Sp. 4 qh. Rostoker.
BE-359. Neuroanatomy. F. 5 qh. Shomay.
BE-379. Real-Time Data Processing. W. 4 qh. Semmlow.
BE-391. Seminar. F, W, Sp. 1 to 4 qh. Staff.
BE-393. Special Problems. F, W, Sp. 2 to 4 qh. Staff.
BE-407. Pattern Recognition II. W. 4 qh. Gose.
BE-408. Cybernetics II. W. 4 qh. Gose.
BE-409. Pattern Recognition Techniques and Systems. 4 qh. Staff.
BE-451. Advanced Biocontrol. F (even years). 4 qh. Zuber.
BE-453. Advanced Systems Physiology. Sp (odd years). 4 qh. Semmlow.

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* Medical Center Staff.

BE-460. Biotransport I — Diffusional Processes. W. 4 qh. Miller.
BE-461. Biotransport II — Flow Processes. Sp. 4 qh. Chow.
BE-484. Bioinstrumentation: systems. F (even years). 3 qh. Zuber.
BE-490. Internship in Bioengineering. F, W, Sp. 1 to 4 qh. Staff.
BE-493. Individual Research. F, W, Sp. 2 to 8 qh. Staff.
BE-497. Colloquium in Bioengineering. F, W, Sp. 0 to 1 qh. Staff.
BE-498. Seminar in Bioengineering. 1 to 4 qh. Staff.
BE-499. Graduate Research. 0 to 16 qh. Staff.

BIOLOGICAL CHEMISTRY

The objective in graduate training in the Department of Biological Chemistry is to provide optimal opportunities for modern biochemical research. Although the orientation is not particularly clinical, the location in a large and active medical center provides an ideal environment for fundamental biochemical studies at all biological and medical levels.

Since the approach to biological chemistry may be primarily chemical or biological, the requirements for graduate work in the department are flexible enough to permit admission of individuals of quite different backgrounds. Undergraduate training should include 16 semester hours of chemistry, including organic and quantitative analysis; 8 semester hours of physics, including laboratory work in electricity, heat, mechanics, and sound; and at least one thorough course in biology. Completion of 6 semester hours of formal course work at the college level in French, German, Russian, or Spanish satisfies the departmental language requirements. For nonprofessional students admission preference is given to those who seek the Ph.D. degree.

Candidates for degrees in biological chemistry are required to take BC-361, BC-362, BC-391 (4 qh), BC-410, BC-411, BC-463, BC-491 (4 qh), and BC-493. A minor in biological chemistry should include BC-361, BC-362, BC-491 (3 qh), and at least 5 quarter hours of formal 400-level course work in biological chemistry.

The thesis must be of sufficient merit to warrant publication in full or in part in a recognized scientific journal.

Graduate Faculty

Professors: Michael Bárány, Henry Gewurz (Adjunct, Rush Medical College), Henry Jeffay, Terrell C. Myers, Samuel Nerenberg,* Edward B. Titchener, Bernard Weissmann.

Associate Professors: C. Arsenis, Jerzy J. Biezenski,* Robert T. Chatterton,* Clyde C. Doughty, Mary Sue Hanlon, Thomas O. Henderson, Ralph

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* Affiliate.

Kathan,* Janos Molnar, T. Rajkumar, Newton Ressler, Mariano Tao, James Vary.

Assistant Professors: Eric Brunngraber,* Bernard Friedenson, Paul Morris.

BC-311. Introduction to Biological Chemistry. F. 5 qh. Vary.
BC-361. Biological Chemistry. F. 5 qh. Doughty.
BC-362. Biological Chemistry. W. 5 qh. Molnar.
BC-391. Biochemical Literature Review. F, W, Sp. 1 qh. Henderson.
BC-401. Immunochemistry. F (even years). 5 qh. (Same as MI-401.) Friedenson, Knight.
BC-410. Biological Research Techniques. W. 5 qh. Weissman.
BC-411. Biological Research Techniques. Sp. 5 qh. Rajkumar.
BC-413. Physical Biochemistry. W (even years). 3 qh. Hanlon.
BC-415. Neurochemistry. W. 2 qh. Brunngraber.
BC-416. Biochemistry and Physiology of Muscle Contraction. Sp. 2 qh. Bárány.
BC-431. Bacterial Genetics. Sp (even years). 5 qh. (Same as MI-431.) Reiter.
BC-432. Biochemical Genetics. Sp (odd years). 4 qh. Morris, Tao, Vary.
BC-463. Biological Chemistry. Sp. 5 qh. Henderson.
BC-464. Recent Trends in Clinical Chemistry. Sp. 1 qh. (Same as PA-464.) Ressler.
BC-491. Seminar and Journal Club. F, W, Sp. 1 qh. Staff.
BC-493. Research in Biological Chemistry. F, W, Sp, Su. 1 to 16 qh. Staff.

GRADUATE COLLEGE ELECTIVES

The following courses offered at the Medical Center campus are in areas which have no graduate degree programs. They are available as electives in all disciplines upon approval of the major adviser. They carry a Graduate College code for identification.

GC-301. Human Genetics. W. 3 qh. Center for Genetics Staff.
GC-311. Psychology of Learning. F. 3 qh. Alberti.
GC-360. Differential Equations. Sp (even years). 4 qh. Prerequisite: Calculus. Grundman.
GC-362. Probability and Statistical Inference I. W. 4 qh. Prerequisite: Calculus. Grundman.
GC-363. Probability and Statistical Inference II. Sp. 4 qh. Prerequisite: GC-362. Grundman.

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* Affiliate.

GC-365. Matrices, Vectors, and Linear Transformations. Sp (odd years). 4 qh. Prerequisite: Calculus. Grundman.
GC-370. Instructional Methods. Sp. 2 qh. R. Foley.
GC-390. Educational Research Statistics. F. 3 qh. Bobula.
GC-391. Construction and Use of Tests in Teaching. F, W, Sp. 2 qh. Rezler, Nerenberg.
GC-401. Biometrics and Applied Statistics. W. 5 qh. Patel.
GC-438. Fundamentals of Curriculum Development. F, W, Sp. 2 qh. Steinberg.
GC-439. Fundamentals of Curriculum Development. F, W, Sp. 3 qh. Steinberg.

HISTOLOGY

The graduate program of the Department of Histology in the College of Dentistry provides training for teachers and investigators in the field of histology as it applies more specifically to the basic sciences related to dentistry. Graduate study in histology leads to the M.S. degree. Faculty members of the department have background in a number of different disciplines; students thereby have a variety of opportunities for specialization within the degree in preparation for careers in many facets of oral biological science.

Students completing the requirements for a master's degree in histology may apply for admission for work toward the Ph.D. degree in anatomy and must comply with requirements of that discipline for the doctorate.

Graduate Faculty

Professors: Luis De La Torre, Dale R. Eisenmann, Milton B. Engel, Arthur F. Grimm, Julia Meyer,* Tawfik Y. Sabet, Dennis F. Weber.
Associate Professors: John W. Everingham, A. E. Zaki.

DH-401. Advanced Oral Histology. F. 3 qh. Weber.
DH-403. Biology of Mineralized Tissues. W (even years). 3 qh. Eisenmann.
DH-404. Fine Structure of Oral Soft Tissues. Sp (odd years). 3 qh. Zaki.
DH-405. Advanced Oral Histology: connective tissue. W. 3 qh. Engel.
DH-406. Advanced Oral Histology: lymphoid tissues. Sp (odd years). 3 qh. Sabet.
DH-493. Research in Histology. F, W, Sp, Su. 1 to 16 qh. Staff.

MEDICAL PSYCHOLOGY

The graduate program in medical psychology is designed to acquaint the student with basic theoretical concepts and methodology relevant to social-psychological research in health service and health related areas. Emphasis is placed on practical experience in research design and data collection.

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* Affiliate.

Graduate study in medical psychology leads to the M.S. degree. Enrollment is open to students who plan on health service careers, and the program is particularly geared to students who are simultaneously enrolled in professional medical curricula. The course of study may be taken on a part-time basis or it may be completed, full time, in three successive quarters.

The medical psychology curriculum emphasizes the interdependence of biological, psychological, and sociological levels in the analysis of behavioral phenomena. The research process is taught through practical experiences in appropriate settings in which students are guided to develop researchable questions and eventually design a master's research project. This experience is coordinated with seminars in research methodology.

All students are required to take MP-310, MP-370, MP-371, MP-372, MP-410, and MP-411. Elective courses are available in a number of areas of possible research specialization in medical psychology.

Graduate Faculty

Professors: Merton M. Gill, Ernest A. Haggard, Thaddeus J. Marczynski,* Theodore Millon.

Associate Professor: Thomas J. Tucker.

Assistant Professors: Louis A. Fourcher, David J. Greenberg, Miodrag Radulovacki,* Wade H. Silverman.

Participating Staff

Professor: Merton S. Krause.

Assistant Professors: Billie Lazar, Michael T. O'Mahoney, John E. Mendoza, Antoinette Saunders, Raymond Sipowicz, James N. Watzke.

Instructors: Robert Meagher, Rona Rubin.

MP-310. Introduction to Social Research. F. 2 qh. O'Mahoney.
MP-366. Sociology of Mental Disorders. W, Sp. 3 qh. (Same as HC-366.) Rowitz.
MP-367. Sociology of Mental Retardation. Sp. 3 qh. (Same as HC-367.) Rowitz.
MP-370. Psychosocial Development. F. 3 qh. Watzke.
MP-371. Social Structure and the Individual. W. 3 qh. Fourcher.
MP-372. Psychosocial Functions and Symbolic Processes. Sp. 3 qh. Rubin.
MP-383. Behavioral Science and Mental Health. Su. 3 qh. Gill, Silverman.
MP-385. Neuropsychology. W. 3 qh. Mendoza.
MP-405. Personality and Psychopathology. W. 4 qh. Millon.

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* Affiliate.

MP-406. Advanced Topics in Psychopharmacotherapy. Su (even years). 2 qh. (Same as PL-406.) Marczynski, Radulovacki.
MP-410. Research Techniques in Medical Psychology. W. 3 qh. Meagher.
MP-411. Research Techniques in Medical Psychology. Sp. 2 qh. Staff.
MP-423. Pharmacology of Behavior. Su (odd years). 2 qh. (Same as PL-423.) Marczynski.
MP-493. Research in Medical Psychology. F, W, Sp, Su. 1 to 16 qh. Staff.

MEDICINAL CHEMISTRY

Medicinal chemistry is the application of scientific principles to the design, synthesis, structure elucidation, and analysis of chemical compounds possessing biological activity. Research in medicinal chemistry is directed toward the correlation of biological activity with chemical structure, physical properties, reaction rates and mechanisms, and drug metabolism. In order to carry out these investigations, the departmental laboratories are equipped with chromatographic equipment; infrared, ultraviolet, nuclear magnetic, and mass spectrometers; and equipment required for radiotracer methodology. The department operates a biological screening program which furnishes biological data for students engaged in research activities.

The applicant's undergraduate education should include: 36 semester hours of chemistry, including at least 10 hours of general chemistry, 4 hours of analytical chemistry, 8 hours of organic chemistry; 8 semester hours of physics; 6 semester hours of mathematics; and at least one course in biology. Calculus and physical chemistry, while not required for admission, must be elected if not previously completed.

Programs of study for new graduate students are individually developed and are based upon research interests, academic backgrounds, and the results of placement examinations. Students who plan to become candidates for the Ph.D. degree must: (1) Pass an examination and demonstrate satisfactory knowledge through course work; (2) Demonstrate a reading knowledge of one foreign language by submitting credit for the equivalent of two years of college-level courses or by satisfactorily completing a reading examination of a language.

During their first quarter, students will be expected to select their research adviser and research project.

Graduate Faculty

Professors: Ludwig Bauer, Charles L. Bell, Ralph Daniels, James E. Gearien, Alfred J. Perkins.

Associate Professors: Rose Ann Grundman, Norman R. Joseph, Alfred Von Smolinski.

Assistant Professors: Bruce Currie, William Dunn, Matthias Lu, Duane Venton.

Participating Staff
Assistant Professors: Michael Johnson, Vincent Madison.

MC-325. Radioactive Isotopes. W. 3 qh. McDaniel, Johnson.
MC-335. Physical Chemistry. W. 4 qh. Perkins, Madison.
MC-336. Physical Chemistry. Sp. 5 qh. Bell, Perkins, Madison.
MC-343. Chemical Toxicology. W. 4 qh. Fitzloff, Lu.
MC-345. Chemistry of Natural Products. F. 4 qh. Bauer, Currie.
MC-347. Organic Chemistry. F. 3 qh. Bauer, Currie.
MC-348. Organic Chemistry Laboratory. F. 2 qh. Bauer, Currie.
MC-349. Pharmaceutical Assaying. F. 4 qh. von Smolinski, Fitzloff.
MC-358. Drug Design. Sp. 4 qh. Dunn, Lu, Fitzloff, Gearien.
MC-401. Advanced Organic Chemistry. W. 4 qh. Lu, Currie, Bauer.
MC-403. The Chemistry of Heterocyclic Compounds. F. 3 qh. Bauer, Currie, Lu.
MC-409. Special Topics in Analytical Chemistry. 5 qh. von Smolinski, Fitzloff.
MC-413. Naturally Occurring Bases of Medicinal Value. W. 3 qh. Bauer.
MC-416. Chemical Aspects of Drug Metabolism. F, Sp. 3 qh. Lu, Fitzloff.
MC-450. Principles of Medicinal Chemistry. F. 4 qh. Gearien, Venton, Fitzloff, Lu.
MC-451. Energy Changes and Rate Processes. W. 3 qh. Madison, Bell.
MC-452. Spectroscopy in Medicinal Chemistry. Sp. 3 qh. Bell, Venton, Johnson.
MC-453. Theoretical Medicinal Chemistry. Sp. 3 qh. Dunn, Daniels.
MC-454. Experimental Techniques in Medicinal Chemistry. Su. 3 qh. Fitzloff, von Smolinski, Bell, Perkins.
MC-455. Stereochemical Aspects of Medicinal Chemistry. 3 qh. Daniels, Venton.
MC-456. Advanced Medicinal Chemistry. W. 4 qh. Currie, Lu.
MC-491. Seminar in Medicinal Chemistry. F, W, Sp. 1 qh. Staff.
MC-493. Research in Medicinal Chemistry. F, W, Sp, Su. 1 to 16 qh. Staff.
MC-494. Advanced Radioactive Isotope Methodology. Sp (even years). 2 qh. McDaniel, Johnson.

MICROBIOLOGY

The graduate program in microbiology provides a solid foundation in general biochemistry and microbiology and, more specifically, in molecular and cellular biology involving immunology, bacteriology, and virology. A major feature of the upper-level graduate courses in microbiology is the tutorial method of teaching. In addition to the reading, which is ancillary to the didactic portion of the course, each student is provided with forty to fifty reprints on classical or current work. Then in a tutorial session with three or more staff members present, the students critically appraise the work. In this way students develop a deeper insight into the validity of published work and enhance their ability to think and write in the field. Usually a single session will cover four or five reprints on related subjects often with conflicting results. The students try among themselves the different concepts that each may have obtained from reading these papers. The staff provides general guidance in these discussions. With this background, a student can proceed to specialize in the area of his interest under the supervision of a departmental faculty member. Active research programs currently under investigation include: molecular and cellular immunology, molecular and cellular virology, microbial genetics, biochemical genetics, and pathogenic bacteriology and mycology. The program is designed to train individuals for careers in teaching and research positions in academic institutions, service and research positions in hospital diagnostic laboratories, as well as research positions in government or in industry.

Applicants with majors in biology and chemistry are eligible.

For the M.S. degree candidates are required to take the following courses: MI-351, MI-352, MI-353, MI-354, MI-355, MI-356, and at least two didactic courses in the 400 series; BC-361 and BC-362. In addition, 15 quarter hours must be earned in MI-493 and 3 quarter hours in MI-491. Medical students who have performed satisfactorily in the basic medical sciences course in microbiology and biological chemistry as part of their studies in medicine may pursue a joint program toward the M.S. degree in microbiology by taking at least two didactic courses in the 400 series, earning 35 quarter hours in MI-493 and 3 quarter hours in MI-491.

The requirements for the Ph.D. degree include courses already completed for the M.S. degree plus a minimum of 15 quarter hours of elective didactic courses in the MI-400 series; 10 quarter hours of didactic course work at the 400 level in biological chemistry; 30 quarter hours of MI-493; and 6 quarter hours in MI-491. Two years of one foreign language at the college level, or one year each of two foreign languages is required; alternatively, a student may satisfy this requirement by passing *Graduate School Foreign Language Tests* (GSFLT) of the Educational Testing Service, Princeton, New Jersey 08540.

All graduate students have the opportunity for a variety of teaching experience and are also expected to participate actively in the various departmental seminars.

Graduate Faculty

Professors: Burton Andersen, Truman Anderson,* Peter Baram, G. Benjamin Bouck,* Friedrich W. Deinhardt (Adjunct, Rush Medical College), Giampiero di Mayorca, Sheldon Dray, Henry Gewurz (Adjunct, Rush Medical College), Helene Guttman,* Paul Heller,* Newton Khoobyarian, Arthur Kroeger, Leon J. LeBeau, Edward A. Lichter,* Maurice A. Mufson,* Robert W. Pumper, Tawfik Sabet,* Stanley K. Shapiro,* Pierson J. Van Alten,* Edward E. Vicher.

Associate Professors: Clara Bell, Dario Giacomoni, Riaz-ul Haque, Olga M. Jonasson,* Katherine L. Knight, Robert L. Northrop,* Harvard Reiter, Edward Wawszkiewicz, Abe Widra.

Assistant Professors: Lawrence A. Falk, Jr.,* W. Carey Hanly,* Meihan Nonoyama.*

Participating Staff

Professor: George Gee Jackson.

Associate Professors: Welton Taylor, Mitsuo Yokoyama.

Assistant Professors: Harvey S. Kantor, David A. Peterson.

MI-325. Microbiology and Immunology: Immunology and Host-Defense. Sp. 3 or 5 qh. Dray and Staff.
MI-326. Microbiology and Immunology: Microorganisms as Agents of Disease. Sp. 3 or 5 qh. Khoobyarian and Staff.
MI-351. General Immunology. W. 3 qh. Molinaro, Hanly.
MI-352. General Bacteriology. F. 3 qh. Haque.
MI-353. General Virology. W. 3 qh. Khoobyarian.
MI-354. Molecular Aspects of Microbiology. F. 3 qh. Giacomoni.
MI-355. Methods in Immunology and Virology. W. 2 to 4 qh. Bell, Khoobyarian.
MI-356. Methods in Bacteriology and Molecular Biology. F. 2 to 4 qh. Haque.
MI-360. Teaching Workshop in Microbiology. Sp. 5 qh. Vicher.
MI-401. Immunochemistry. F (even years). 5 qh. Knight, Friedenson.
MI-402. Immunobiology. W (odd years). 5 qh. Baram.
MI-403. Advanced Virology. Sp (odd years). 5 qh. di Mayorca.
MI-404. Medical Mycology. Su (even years). 2 qh. Widra.
MI-405. Medical Virology. F. 5 qh. Pumper.

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* Affiliate.

MI-406. Medical Immunology. F (odd years). 5 qh. Gewurz, Yokoyama.
MI-407. Oncogenic Viruses. Sp (even years). 5 qh. Deinhardt.
MI-408. Immunogenetics. W (even years). 5 qh. Hanly, Knight, Dray.
MI-430. Medical Bacteriology. Su. 5 qh. Vicher, LeBeau.
MI-431. Bacterial Genetics. W (even years). 5 qh. Reiter.
MI-432. Biochemical Genetics. Sp (odd years). 4 qh. (Same as BC-432.) Morris, Tao, Vary.
MI-433. Bacterial Physiology. W (odd years). 5 qh. Wawszkiewicz.
MI-491. Seminar in Microbiology. F, W, Sp. 1 qh. Staff.
MI-493. Research in Microbiology. F, W, Sp, Su. 1 to 16 qh. Staff.

NURSING SCIENCES

Graduate education in nursing consists of two degree programs: the professional program leading to the Master of Science in Nursing (M.S.N.) degree and the research program leading to the Ph.D.* The M.S.N. degree program prepares specialists in the practice areas of nursing, including a firm base in research methodology, while the doctoral program emphasizes advanced theoretic and research training.

The M.S.N. program provides advanced study options in the following areas:

- Maternity-midwifery nursing
- Medical-surgical nursing
- Nursing service administration
- Psychiatric-mental health nursing
- Public health nursing

The M.S.N. program is fully accredited by the Council of Baccalaureate and Higher Degree Programs of the National League for Nursing.

As an applied scientific field, nursing draws from both biologic and social sciences to form its theoretic base. The doctoral program emphasizes the preparation of researchers who will investigate problems relevant to the field of nursing, and is designed to develop analytic thinkers who have the ability to synthesize and integrate knowledge from related scientific fields into the study of problems central to nursing.

In addition to the Ph.D. program in nursing, students are encouraged to pursue doctoral education in related scientific fields (e.g., anatomy, microbiology, physiology). Funding is available for nurses with such interests.

Additional Admission Requirements

- Completion of an accredited baccalaureate degree program with an upper division major in nursing.

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* Pending approval of Ph.D. program.

- Licensure to practice as a professional nurse in at least one political jurisdiction.
- A personal interview with a graduate faculty member in the area of study selected.

For those seeking admission to the doctoral program, the Miller Analogies Test is required.

Financial Assistance

Several sources of financial aid are available. Graduate students can borrow under the Federal Nursing Student Loan Program and the National Direct Student Loan Act. Commitment to accept a commission in certain armed forces after graduation allows the student to qualify for generous assistance. In addition, study-work programs are available for students admitted to the program. Address all questions about financial aid to:

Assistant Dean for Graduate Study
College of Nursing
University of Illinois at the Medical Center
P.O. Box 6998
Chicago, Illinois 60680

Graduate Faculty (General)

Professors: Gladys Courtney, Sabath F. Marotta,* Martha Pitel, Jack Weinberg,* Harriet Werley.

Associate Professors: Pauline Bart,* Rue Bucher,* Maurice Joseph,* Wadie Kamel,* Lois J. Malasanos, Agnes Rezler, Paul Singer,* Thomas V. Telder,* Robert I. Yufit.*

Assistant Professors: Linda G. Hiles, Hannah M. Marshall, Minu K. Patel, Paul Reichelt, Louis Rowitz.*

Participating Staff

Assistant Professor: Elizabeth Wesseling.

NU-309. Dynamics of Small Groups. F, W. 3 qh. Stokes and Staff.
NU-370. Curriculum and Instruction. W, Sp. 2 qh. R. Foley and Staff.
NU-383. Principles of Administration. F, W, Sp. 2 qh. Ellsworth and Staff.
NU-385. Social Statistics. F, W. 2 qh. Patel.
NU-406. Contemporary Trends in Community Mental Health. F. 2 qh. L. Levy.
NU-407. Mental Health in Urban Areas. W. 2 qh. L. Levy.
NU-410. Clinical Nursing Modes of the Future. Sp. 2 qh. Staff.

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* Affiliate.

NU-411. Practicum in Clinical Modes. F, W, Sp. 2 to 6 qh. Staff.
NU-413. Theories of Nursing. 3 qh. Staff.
NU-414. Theories for Nursing. 3 qh. Staff.
NU-415. Nursing Research Technique and Design. 6 qh. Staff.
NU-440. Special Topics in Nursing Sciences. (Consult department for subtitle.) F, W, Sp. 2 to 4 qh. Staff.
NU-474. Practice Teaching in Nursing. F, W. 5 to 6 qh. Staff.
NU-487. Practice Supervision in Clinical Nursing Services. F, W. 5 to 6 qh. Ellsworth and Staff.
NU-491. Seminar in Nursing I. F, W, Sp. 2 qh. Staff.
NU-491. Seminar in Nursing II. F. 2 qh. Staff.
NU-492. Tactics and Strategy in Research. F, W, Sp. 3 qh. Hiles and Staff.
NU-493. Research in Nursing I, II, III. F, W, Sp, Su. 0 to 5 qh. Staff.

AREAS OF SPECIALIZATION

Maternity-Nurse Midwifery. Focus is upon development of detailed understanding of the normal processes of the maternity cycle, a thorough understanding of the prodromal symptoms of complications, and the relationship of these to the development and utilization of safe, effective health services for patients. Lectures, seminars, clinical experiences, and tutorial sessions are planned to enable the student gradually to assume responsibility for supervision, care, and management of the medically and obstetrically uncomplicated patient.

Gradute Faculty

Professor: Lillian Runnerstrom.
Associate Professor: Gene Anderson.

Participating Staff

Assistant Professors: Afton Arnold, Chris Henningson, Joyce Roberts.
Instructors: Jean Barron, Mary Brucker, Jean Downie, Sharon Jones, Sarah Naber, Audrey Pierre, Patricia Urbanus.

NU-330. Advanced Maternity Nursing I — Antepartum. F. 4 qh. Runnerstrom and Staff.
NL-330. Laboratory Practice: Advanced Maternity Nursing I — Antepartum. F, Su. 2 to 5 qh. Runnerstrom and Staff.
NU-335. Advanced Maternity Nursing IV — The Neonate. F, Su. 3 qh. Runnerstrom and Staff.
NL-335. Laboratory Practice: Advanced Maternity Nursing IV — The Neonate. F, Su. 2 to 5 qh. Runnerstrom and Staff.

NU-339. History and Trends in Nurse-Midwifery. F, W, Sp, Su. 2 qh. Runnerstrom.
NU-431. Advanced Maternity Nursing II — Intrapartum. W. 4 qh. Runnerstrom and Staff.
NL-431. Laboratory Practice: Advanced Maternity Nursing II — Intrapartum. W. 2 to 5 qh. Runnerstrom and Staff.
NU-432. Advanced Maternity Nursing III — Postpartum. Sp. 4 qh. Runnerstrom and Staff.
NL-432. Laboratory Practice: Advanced Maternity Nursing III — Postpartum. Sp. 2 to 5 qh. Runnerstrom and Staff.
NU-434. Advanced Maternity Nursing V — Independent Study. F, W, Sp, Su. 2 to 4 qh. Runnerstrom and Staff.
NL-434. Laboratory Practice: Advanced Maternity Nursing V — Independent Study. F, W, Sp, Su. 2 to 5 qh. Runnerstrom and Staff.

Medical-Surgical Nursing. Graduate content in medical-surgical nursing is built on a continuum wherein selected problems are investigated: pathophysiology related to the neurologic and gastrointestinal systems; to the respiratory and cardiovascular systems; and to the renal and endocrine systems. Focus is on identification of nursing interventions required to enable patients to regain equilibrium. Clinical practice centers on the problems under investigation.

Graduate Faculty

Professor: Etta Anne Hincker.
Associate Professors: Irene B. Alyn, Mary E. Bevis, Isabel MacRae, Kathleen Smyth.
Assistant Professors: Felissa L. Cohen, Marya Olgas.

Participating Staff

Assistant Professor: Barbara Ann Hurley.

NU-320. Advanced Medical-Surgical Nursing. F. 3 qh. MacRae, Olgas.
NL-320. Laboratory Practice: Advanced Medical-Surgical Nursing. F. 2 to 5 qh. Hincker and Staff.
NU-421. Advanced Medical-Surgical Nursing. W. 3 qh. Hurley, Smyth.
NL-421. Laboratory Practice: Advanced Medical-Surgical Nursing. W. 2 to 5 qh. Hincker and Staff.
NU-422. Advanced Medical-Surgical Nursing. Sp. 3 qh. Alyn, Bevis.
NL-422. Laboratory Practice: Advanced Medical-Surgical Nursing. Sp. 2 to 5 qh. Hincker and Staff.

NU-423. Advanced Medical-Surgical Nursing — Independent Study. F, W. 3 qh. Hincker and Staff.

NL-423. Laboratory Practice: Advanced Medical-Surgical Nursing — Independent Study. F, W. 2 to 5 qh. Hincker and Staff.

Nursing Service Administration. The graduate program in nursing service administration is designed to enable the student to acquire an understanding of administrative theory and its application to various levels and types of responsibility. Focus is upon development of behaviors appropriate to the central administrative processes of decision-making, communicating, building morale, and coping with change. Concepts and learning experiences are selected which will help students become more perceptive about process variables and implications for administrative behavior.

Graduate Faculty

Professor: Mary K. Mullane.

Assistant Professor: Margaret Ellsworth.

Participating Staff

Associate Professor: Janet Silliman Moore.

Assistant Professors: Sister Francesca Lumpp, Barbara J. Stevens.

NU-480. Organization of Nursing Services. F. 3 qh. Mullane and Staff.

NL-480. Laboratory Practice in Organization of Nursing Services. F. 3 qh. Mullane and Staff.

NU-481. Administrative Functions in Nursing Services. W. 3 qh. Mullane and Staff.

NL-481. Laboratory Practice in Administrative Functions in Nursing. W. 3 qh. Mullane and Staff.

NU-482. Staff Support Services in Nursing. Sp. 3 qh. Mullane and Staff.

NL-482. Laboratory Practice in Staff Support Services in Nursing. Sp. 3 qh. Mullane and Staff.

NU-483. Independent Study in Nursing Administration. F, W, Sp. 3 qh. Mullane and Staff.

NL-483. Laboratory Practice in Independent Study in Nursing Administration. F, W, Sp. 3 to 4 qh. Mullane and Staff.

Psychiatric–Mental Health Nursing. Current concepts of psychiatric nursing are explored in community mental health settings where services are provided for the adult, adolescent, child, and family. These mental health agencies represent university- and state-operated facilities with diverse patient population and treatment modalities, including hospitalization. Emphasis is given to concepts of individual psychotherapy, family therapy, group psychotherapy, crisis intervention, and the role of the psychiatric nurse in the community. Students develop prevention as well as clinical treatment and rehabilitation skills.

Graduate Faculty

Professors: Helen K. Grace, Joan M. King, Mary M. Lohr,* Gertrude A. Stokes.
Associate Professors: Rachel Bliss, Leo Levy.*
Assistant Professor: Lorna Barrell.

Participating Staff

Assistant Professors: Dorothy Camilleri, Marguerite Dixon, Gloria George.
Instructors: Patricia Fitzpatrick, Barbara Logan, Sally Lundeen, Karen Skerrett.

NU-350. Advanced Psychiatric Nursing. F. 3 qh. Stokes and Staff.
NL-350. Laboratory Practice: Psychiatric Nursing. F. 2 to 5 qh. Stokes and Staff.
NU-451. Advanced Psychiatric Nursing. W. 3 qh. Stokes and Staff.
NL-451. Laboratory Practice: Psychiatric Nursing. W. 2 to 5 qh. Stokes and Staff.
NU-452. Advanced Psychiatric Nursing. Sp. 3 qh. Stokes and Staff.
NL-452. Laboratory Practice: Psychiatric Nursing. Sp. 2 to 5 qh. Stokes and Staff.
NU-453. Advanced Psychiatric Nursing — Independent Study. F, W. 3 qh. Stokes and Staff.
NL-453. Laboratory Practice: Psychiatric Nursing — Independent Study. F, W. 2 to 5 qh. Stokes and Staff.

Public Health Nursing. Focus is upon the assessment process for the purpose of planning, implementing, and evaluating practice with families, individuals, and special population groups with whom nurses interact in community settings. A variety of options is available which permit the student to prepare for specialty practice as a community nurse practitioner or as a family nurse practitioner. Students in the public health nursing sequence concurrently enroll in courses in the Department of Public Health Sciences for a portion of their work.

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* Affiliate.

Graduate Faculty
Professor: Virginia M. Ohlson.
Associate Professors: Gertrude Hess, Jean M. Wood.
Assistant Professor: Shu-pi C. Chen.

Participating Staff
Associate Professor: Elaine C. Smith.
Assistant Professors: Violet Barkauskas, Eunice Kelly, Muriel Moss.
Instructors: Carrie Schopf, Kathryn Stoltenberg.

NU-360. Advanced Public Health Nursing I: Community Assessment for Public Health Nursing Practice. F. 3 qh. Hess.
NL-360. Laboratory Practice: Advanced Public Health Nursing I. F. 3 to 5 qh. Hess and Staff.
NU-361. Health Assessment in Primary Care. W. 3 qh. Ohlson, Barkauskas, Moss, Stoltenberg, Schopf.
NL-361. Laboratory Practice: Primary Care. W. 3 qh. Ohlson and Staff.
NU-461. Advanced Public Health Nursing II: Public Health Nursing Practice with Families. W. 3 qh. Hess, Wood.
NL-461. Laboratory Practice: Advanced Public Health Nursing. W. 3 qh. Hess, Wood, and Staff.
NU-462. Advanced Public Health Nursing III: Program Evaluation for Public Health Nursing Practice. Sp. 3 qh. Chen.
NL-462. Laboratory Practice: Advanced Public Health Nursing III. Sp. 3 qh. Chen, Wood.
NU-463. Advanced Public Health Nursing IV: Independent Study. F, W, Sp. 3 qh. Ohlson and Staff.
NL-463. Laboratory Practice: Advanced Public Health Nursing IV. F, W, Sp. 2 to 5 qh. Ohlson and Staff.
NU-465. Health Assessment and Primary Care — Adults. F. 3 to 6 qh. Ohlson, Stoltenberg, Barkauskas, Schopf.
NL-465. Laboratory Practice: Health Assessment and Primary Care — Adults. F. 3 qh. Ohlson and Staff.
NU-466. Health Assessment and Primary Care — Children. Sp. 3 qh. Ohlson, Moss, Barkauskas.
NL-466. Laboratory Practice: Health Assessment and Primary Care — Children. Sp. 3 qh. Ohlson and Staff.

ORAL AND MAXILLOFACIAL SURGERY

The M.S. degree is offered in oral and maxillofacial surgery. The program is designed to provide training in research and teaching as well as a comprehensive basic science background for individuals interested in pursuing academic careers in the specialty.

The prerequisite for admission is a D.D.S. or D.M.D. degree from an accredited institution.

At least 20 quarter hours of OS-493 are required for the M.S. degree. In addition, formal courses are required, including some in pathology, anatomy, oral pathology, histology, pharmacology, physiology, or other courses suited to the individual needs of the student.

A minimum of two years is necessary to obtain the M.S. degree for students not participating in the clinical program. During this period the student is required to devote a portion of time to teaching and assisting in the department. Students in the combined didactic and clinical training program are registered in the Graduate College on a part-time basis during their four-year residency.

Individuals participating in the graduate degree program as part of the four-year oral surgery residency receive financial support from the University of Illinois Hospital and are exempt from tuition and fees.

Graduate Faculty

Professors: Allen F. Goldberg,* Daniel M. Laskin, Eugene C. Lekan, George Stadnicki.

OS-493. Research in Oral and Maxillofacial Surgery. F, W, Sp, Su. 1 to 16 qh. Staff.

ORAL PATHOLOGY

Graduate study in oral pathology leads toward the M.S. degree. The program is devised to provide training for teachers and investigators in the field of oral pathology and a knowledge of the entire field of pathology.

The applicant must have received the D.D.S. degree, or have earned a degree in basic science.

Courses required of all candidates for the M.S. degree in oral pathology include 4 to 6 quarter hours in advanced oral pathology.

Opportunities for thesis research are available in the numerous laboratory disciplines practiced in the department. As part of their experience students include in their timetable some participation in departmental teaching and the study of human oral pathology. Alternatively, after satisfactory completion of 48 quarter hours of graduate study, students may be eligible to bypass the M.S. degree and proceed towards the Ph.D. degree.

On completion of the requirements for the M.S. degree in oral pathology students may apply for admission for work toward the Ph.D. degree in pathology.

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* Affiliate.

Graduate Faculty

Professors: Carl Cohen,* Stanley J. Gerson, Nicholas G. Grand, Herman Medak,* Julia Meyer, Samuel Pruzansky,* John P. Waterhouse.
Associate Professors: Erwin P. Barrington,* Shu-Yung Wang.
Assistant Professor: Muhammad Iqbal.

Participating Staff

Professor: Arup K. Das.
Assistant Professors: Iain P. Hunter, James J. Sciubba.

OP-401. Advanced Oral Pathology. F. 2 qh. Waterhouse and Staff.
OP-402. Advanced Oral Pathology. W. 2 qh. Gerson.
OP-491. Seminar in Oral Pathology. Sp. 2 qh. Waterhouse, Sciubba, Wang, and Hunter.
OP-493. Research in Oral Pathology. F, W, Sp, Su. 1 to 16 qh. Staff.

ORTHODONTICS

The M.S. degree is offered in orthodontics. The program is primarily one of training for research and teaching in the basic and applied sciences in orthodontics.

All applicants must have the D.D.S. degree or its equivalent from an accredited dental college.

A residence of twenty-four consecutive months (two and two-thirds academic years) is required of candidates for the M.S. degree. Required courses include RD-401 and at least 20 quarter hours in RD-493. Sixteen quarter hours of formal courses exclusive of seminars are required, not more than 5 quarter hours of which may be absolved by RD-401. Other requirements are met by taking AN-350, DH-401, GC-301, and other courses in the basic sciences. Additional courses may be required by the major adviser. Students must register for a full program of 16 quarter hours each quarter, part of which is met by the clinical program and clinically associated courses. These courses do not receive Graduate College credit, but are required in the orthodontic program.

Graduate Faculty

Professors: Howard Aduss, John F. Cleall, Bernard J. Schneider.
Assistant Professor: Zane F. Muhl.

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* Affiliate.

Participating Staff

Associate Professor: Louis M. Andria.
Assistant Professor: Andrew J. Haas.

RD-401. Orthodontics (Growth and Development of Oral, Facial, and Cranial Structures and Organs). F, W, Sp, Su. 1 to 5 qh. Cleall, Muhl, Schneider.
RD-493. Research in Orthodontics. F, W, Sp, Su. 1 to 16 qh. Staff.

ORTHOPEDIC SURGERY

Graduate study in orthopedics is offered by the department leading to the M.S. degree. A unique opportunity exists to provide a limited number of individuals who expect to make careers of teaching and research with sound backgrounds in the related basic sciences, in scientific investigation, and in teaching.

Prerequisites are the M.D. degree and at least one year of internship.

Graduate work for the degree includes attendance at one seminar per quarter for three quarters in one of the related basic science disciplines. Among the formal 400 series courses, the following are suggested: AN-421, DH-403, MI-402, and RA-410. Attendance at staff conferences and seminars in orthopedics is also required.

Graduate Faculty

Professors: Riad Barmada, Robert D. Ray.

Participating Staff

Professor: William Meltzer.

RS-491. Seminar in Orthopedics. F, W, Sp, Su. 2 qh. Ray and Staff.
RS-493. Research in Orthopedics. F, W, Sp, Su. 1 to 16 qh. Staff.

PATHOLOGY

Pathology, as a graduate college discipline, offers research opportunities to students of diverse interests on the Medical Center campus leading to the M.S. and Ph.D. degrees in pathology. Additionally, the department participates in an interdisciplinary program in biology and experimental pathology (see section IV-4.1).

The objectives of pathology are to elucidate the etiology and pathogenesis of disease; to study the causative agents or underlying conditions; to contribute to diagnostic procedures; and to trace the transformation of a normal tissue or process into its abnormal morphology or function. The field of pathology is broad, as are its methods of study which may be unique to the discipline or may in part comprise those of all other basic and clinical sciences. Pathologic studies may be concerned with morphology (gross; light, polarizing, and ultraviolet microscopy; electron and electron scanning microscopy), with biochemistry at many levels of sophistication, with biophysics, and with molecular biology.

Career opportunities differ with the training and interests of individual students. For example, the goals of the M.D., D.D.S., or D.V.M. graduate (or prospective graduate) might comprise academic teaching, a service assignment, and research. For the medical technologist or liberal arts candidate, a goal could be advanced opportunities in laboratory medicine, teaching, and research, or any combination of these.

Graduate Faculty

Professors: Burton R. Andersen,* Anatoly Bezkorovainy,* Carl Cohen,* Walter Fried,* Stanley Gerson,* Cecil A. Krakower,** Daniel M. Laskin,* Leon J. LeBeau, Elie P. Leroy, Elizabeth A. McGrew, Julia Meyer,* Samuel T. Nerenberg, John P. Waterhouse,* Ruth L. Wong.

Associate Professors: Friedrich A. O. Eckner, Robert B. Epstein,* Robert F. Locke,* Newton Ressler, Ursula F. Rowlatt.

Assistant Professors: Robert J. Buschmann, Jose R. Manaligod, Herbert M. Yamashiroya.

Participating Staff

Professor: Orville T. Bailey.

Associate Professor: M. Mitsuo Yokoyama.

Assistant Professors: Lawrence Blecka, Robert McKiel, Jr., Seymon Millner, Emil Popescu.

PA-325. General Pathology. F. 5 qh. Staff.
PA-326. Organ Pathology. W. 4 qh. Staff.
PA-327. Clinical Pathology. W. 4 qh. Staff.
PA-401. Experimental Pathology. F. 5 qh. Staff.
PA-402. Histochemistry. Sp. 5 qh. Eckner.
PA-403. Physiological Basis of Pathology. W. 5 qh. Staff.
PA-404. Ultrastructural Pathology. W. 5 qh. Buschmann.
PA-430. Medical Bacteriology. Su. 5 qh. (Same as MI-430.) Vicher, LeBeau.
PA-464. Recent Trends in Clinical Chemistry. W or Sp. 1 qh. Ressler.

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* Affiliate.
** Distinguished Research Professor.

PA-491. Pathology Seminar. F, W, Sp. 2 qh. Staff.
PA-493. Research in Pathology. F, W, Sp, Su. 1 to 16 qh. Staff.

PEDODONTICS

The mission of the department is to conduct educational programs in the field of pedodontics. The department has as one of its goals the preparation of qualified and interested dentists for academic careers in teaching and research in pedodontics or for careers combining teaching, research, and practice. The M.S. degree is awarded to those candidates who successfully complete the graduate program, which consists of a curriculum arranged best to meet the academic objectives of the candidate while at the same time meeting the requirements of the Graduate College.

The thesis must utilize any basic science discipline yet be oriented to problems related to the field of pedodontics. In addition, the candidate must successfully complete the postgraduate clinical training concurrently, which is not credited toward the degree requirements. A minimum residence of twenty-four months (eight quarters full-time) is required. Applicants who have already completed postgraduate training may complete the graduate program in twelve months (four quarters full-time).

Applicants must have a doctoral degree or equivalent from an acceptable dental school. Details concerning the program are available from the department.

Graduate Faculty

Professor: Allen W. Anderson.
Associate Professors: Raynard J. Dooley,* Hannelore T. Loevy, Indru C. Punwani.

PE-310. Principles and Methods in Dental Research. Su. 2 qh. Dooley.
PE-311. Principles and Methods in Dental Research. F. 2 qh. Anderson.
PE-312. Principles and Methods in Dental Research. W. 2 qh. Anderson.
PE-401. Dental Pediatrics. F. 2 qh. Punwani.
PE-402. Dental Pediatrics. W. 2 qh. Punwani.
PE-403. Dental Pediatrics. Sp. 2 qh. Punwani.
PE-405. Dental Genetics. Sp. 2 qh. Loevy.
PE-493. Research in Pedodontics. F, W, Sp, Su. 1 to 16 qh. Staff.

PHARMACOGNOSY AND PHARMACOLOGY

The department offers programs leading to the M.S. and Ph.D. degrees in pharmacognosy.

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* Affiliate.

The major aim in the graduate program in pharmacognosy is to educate and train qualified individuals in the sciences of pharmacognosy and natural products chemistry for career opportunities in academic teaching and research, as well as research positions in government, in industry, and in private research institutes.

In the pharmacognosy program the phytochemical, biochemical, and biological aspects of natural products are emphasized. The major research effort is concerned with the isolation, identification, and elucidation of structure of plant constituents having biological activity. Other areas of pharmacognostical research include biotransformation and qualitative and quantitative analyses of natural products.

Qualified students lacking Pharmacognosy 232 and 233, Pharmacology 241, 242, and 243, or their equivalent may be admitted but will be required to remedy their deficiencies early in their graduate programs.

Candidates for the M.S. degree must complete not less than 23 quarter hours and candidates for the Ph.D. degree not less than 40 quarter hours of formal core courses. Reading proficiencies in German and one other foreign scientific language are required for the Ph.D. student. This requirement must be satisfied by either two years of college-level work or by departmentally administered examination, and it must be fulfilled prior to admittance as a Ph.D. candidate. Candidates for the Ph.D. degree are encouraged and given opportunities to participate in undergraduate teaching.

Graduate Faculty

Professors: Norman R. Farnsworth, Harry H. S. Fong, Edward S. Mika, Ralph W. Morris, Elmore H. Taylor.

Associate Professors: John P. Bederka, Philippe S. Benoit, Audrey S. Bingel, Emmanuel B. Thompson.

Assistant Professors: Geoffrey A. Cordell, Norman L. Katz, Maung Tin-Wa.

Participating Staff

Assistant Professor: Robert Dobberstein.

PP-302. Plant Physiology. Sp (odd years). 5 qh. Mika.
PP-303. Chemotaxonomy. F (even years). 4 qh. Fong.
PP-305. Plant Taxonomy. Su (even years). 5 qh. Farnsworth.
PP-307. Phytoscreening. Sp (odd years). 3 qh. Farnsworth.
PP-311. Drug Bioscreening. W. 5 qh. Thompson.
PP-360. Microscopy Natural Drug Products. W. 4 qh. Mika.
PP-401. Drug Plant Cultivation. Su (odd years). 5 qh. Mika.
PP-402. Phytochemistry. Su (odd years). 5 qh. Tin-Wa.
PP-404. Biosynthesis. Sp (even years). 5 qh. Taylor and Cordell.

PP-410. Pharmacognosy Research Techniques. F (odd years). 5 qh. Dobberstein.

PP-491. Seminar in Pharmacognosy. F, W, Sp. 1 qh. Staff.

PP-493. Research in Pharmacognosy. F, W, Sp, Su. 1 to 16 qh. Staff.

Supporting courses may be chosen from the following: BC-361, BC-362; MC-325, MC-345, MC-347, MC-401, MC-402, MC-403, MC-408, MC-410; MI-325; PM-431; and PL-325, PL-326, PL-493.

PHARMACOLOGY

Pharmacology is the science which deals with the qualitative and quantitative aspects of the effects of chemical compounds upon the living organism. Specialized training is offered at the molecular as well as at the clinical level, and includes studies of drug metabolism, effects of drugs on the peripheral nervous system, brain, behavior, cardiovascular system, intermediary metabolism, and enzyme systems of experimental animals and of man.

Preference is given to applicants who have completed undergraduate majors in biological sciences or chemistry and who are interested in teaching and research careers in the medical sciences.

The study of pharmacology requires a thorough knowledge of chemistry, biochemistry, and physiology. Depending upon the area of research specialization, competency in microbiology, anatomy, biophysics, or pathology may be required. Accordingly, the programs in pharmacology leading to the M.S. and Ph.D. degrees require broad training in basic medical sciences as well as advanced courses in pharmacology. The curriculum is designed to train candidates for teaching in medical schools and for research in universities, industry, and governmental laboratories.

Proficiency in one foreign language is required for the Ph.D. degree. The thesis for the doctorate should be of such merit as to warrant publication, in part or in full, in a recognized scientific journal. Participation in teaching in laboratories, conferences, and seminars is part of the curriculum of all degree candidates.

Graduate Faculty

Professors: Edmund G. Anderson, Maynard M. Cohen,* Harold Feinberg, Tadeusz J. Marczynski, Everett W. Maynert, Martin P. Schulman, Theodore R. Sherrod, Klaus R. Unna.

Associate Professors: Phyllis H. Bogner, Richard D. Green, George R. Honig,* Lawrence Isaac.

Assistant Professors: Ronald L. Foreman, Judith C. Kusek, Richard A. Levy, Miodrag Radulovacki.

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* Affiliate.

Participating Staff
Assistant Professor: Herbert K. Proudfit.

PL-325. Pharmacology I. Su. 5 qh. Staff.
PL-326. Pharmacology II. F. 5 qh. Staff.
PL-402. Biochemical Mechanisms of Drug Action. W (odd years). 2 qh. Schulman, Maynert, Foreman, Kusek.
PL-405. Advanced Topics in Cardiovascular and Renal Pharmacology. Sp (odd years). 2 qh. Sherrod.
PL-406. Advanced Topics in Psychopharmacotherapy. Su (even years). 2 qh. Marczynski, Radulovacki.
PL-408. Metabolism of Drugs. (even years). 2 qh. Schulman.
PL-409. Chemical Structure and Biological Activity. F (even years). 2 qh. Maynert, Foreman, Kusek.
PL-410. Molecular Basis of Cardiac Drug Action. W (even years). 2 qh. Feinberg.
PL-420. Pharmacology of Receptors, Neurones, and Synapses. Sp (even years). 2 qh. Green, Anderson, Levy, Proudfit.
PL-421. Pharmacology of Central Integrative Processes. Sp (odd years). 2 qh. Anderson, Levy, Green, Proudfit.
PL-423. Pharmacology of Behavior. Su (odd years). 2 qh. Marczynski.
PL-425. Pharmacology of Catecholamines. Sp (odd years). 2 qh. Maynert.
PL-426. Pharmacology of Putative Transmitters. Sp (even years). 2 qh. Anderson, Levy, Green, Proudfit.
PL-428. Developmental Pharmacology. F (odd years). 2 qh. Isaac, Schulman.
PL-491. Pharmacological Seminar. F, W, Sp, Su. 1 qh. each quarter. Staff.
PL-493. Research in Pharmacology. F, W, Sp, Su. 1 to 16 qh. Staff.

PHARMACY

The Department of Pharmacy offers programs leading to M.S. and Ph.D. degrees. These are designed to give the candidate an adequate background in the basic physical, biological, and pharmaceutical sciences, and the related health disciplines. Sufficient flexibility is permitted so that the candidate can develop in breadth and in depth in selected areas of specialization. Graduate study in the department prepares qualified individuals for teaching, hospital pharmacy, industry, and research in the field of pharmacy.

The applicant should have received an undergraduate degree in pharmacy from a recognized college of pharmacy. Applicants holding degrees from a college other than a college of pharmacy may be accepted if they are currently completing the requirements for a bachelor's degree in pharmacy.

Undergraduate preparation should include general and inorganic chemistry, organic chemistry, physics, biological chemistry, pharmaceutical analysis, pharmacology, and pharmaceutics. Higher mathematics including calculus and an elementary course in physical chemistry is advisable.

Candidates for the M.S. degree must include in their programs 4 quarter hours in PM-491 and at least 20 quarter hours in PM-493.

Programs of study for doctoral candidates are developed to meet the requirements of an area of specialization offered within the department. Areas of specialization include general pharmacy, physical pharmacy, biopharmaceutics, and industrial pharmacy. All doctoral candidates must take for credit 8 quarter hours of PM-491 and a minimum of 75 quarter hours of PM-493. In addition to a required core program for each specialization, elective courses may be selected from graduate course offerings in medicinal chemistry, biological chemistry, microbiology, pharmacognosy, pharmacy, and others. Upon completion of all formal course requirements, doctoral candidates must pass successfully a departmental examination which is in part written and in part oral. The thesis research must be an original investigation and should deal with some basic science project within the selected area of specialization.

The department offers a master of science degree program with emphasis in hospital pharmacy. The following courses are suggested for this program: PM-301, PM-302, PM-305, and PM-425; and MC-325. Residencies in hospital pharmacy are available at several cooperating hospitals and may be taken simultaneously with the master's program. A Certificate of Residency is awarded by the hospital upon successful completion of the residency program.

Graduate Faculty

Professors: Angel S. Arambulo, Martin I. Blake, Dwight L. Deardorff, Bernard Ecanow, August P. Lemberger,* Robert G. Mrtek, Harold J. Rhodes, Frederick P. Siegel.
Associate Professor: Win L. Chiou.
Assistant Professor: Sarfaraz Niazi.

Participating Staff

Associate Professor: Richard Hutchinson.
Assistant Professor: Jesse Stewart.

PM-301. Hospital Pharmacy Practice I. F or W. 3 qh. Hutchinson, Stewart.
PM-302. Hospital Pharmacy Practice II. W or Sp. 3 qh. Hutchinson.

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* Affiliate.

PM-305. Physical Pharmacy. Sp. 3 qh. Ecanow, Arambulo.
PM-310. Pharmaceutical Manufacturing Unit Operations. W. 3 qh. Ecanow.
PM-402. Manufacturing Pharmacy. F, W, Su. 3 to 5 qh. Deardorff, Arambulo.
PM-404. Pharmaceutical Kinetic Theory. 3 qh. Niazi.
PM-405. Stability of Pharmaceutical Systems. F. 3 qh. Niazi.
PM-410. Polyphasic and Disperse Systems I. Sp. 3 qh. Deardorff.
PM-411. Polyphasic and Disperse Systems II. Su. 3 qh. Deardorff.
PM-420. Pharmacokinetics. F. 3 qh. Chiou.
PM-425. Dissolution and Bioavailability of Dosage Forms. W. 2 qh. Siegel.
PM-431. Chromatography in Pharmaceutical Research. F. 3 qh. Rhodes.
PM-440. Special Topics in Pharmacy (Consult department for subtitle.). F, W, Sp, Su. 2 to 4 qh. Staff.
PM-491. Seminar in Pharmacy. F, W, Sp. 2 qh. Staff.
PM-493. Research in Pharmacy. F, W, Sp, Su. 1 to 16 qh. Staff.

PHYSIOLOGY

The Department of Physiology offers facilities and opportunities for study and research leading to the degree of Doctor of Philosophy. A limited number of students is accepted for the degree of Master of Science. The program of graduate studies includes general and mammalian physiology, biophysics, molecular physiology, pathophysiology, and behavioral biology. The department participates in an interdisciplinary program in bioengineering (see section IV-4 and page 32).

Concurrent degree programs are also available for professional students in dentistry, medicine, and nursing who are interested in research and academic careers.

The research activities of the department include: study of the biosynthesis and mechanism of action and inactivation of hormones at the organ, cellular, and subcellular levels; elucidation of sequence and biofunctional conformation of peptide hormones and hypophysiotropic factors; search for smooth muscle active agents with potential as antifertility agents; research in renal physiology, hypertension, lipid metabolism, stress, active transport, cellular physiology, neurophysiology, cellular function of skeletal muscle, respiratory mechanics, and cardiovascular control.

Doctoral candidates are expected to be prepared in undergraduate course work that includes chemistry through organic and preferably physical chemistry; mathematics through calculus; and at least one year each of biology and physics.

Graduate Faculty

Professors: Gyan C. Agarwal,* Robert A. Arzbaecher,* Pietro O. Bramante, Earl E. Gose,* Ruven Greenberg, Arthur F. Grimm,* Alois D. Hastreiter,* Neil A. Kurtzman,* Ruy V. Lourenco,* Sabath F. Marotta,* Irving F. Miller,* Akira Omachi, Kenneth M. Rosen,* John T. Sharp,* Nicholas Torok,* Roderich Walter, Bert L. Zuber.*

Associate Professors: Kate Bárány, Philip L. Hawley, Robert F. Loizzi, James J. McGrath,* Charles H. Rodgers.*

Assistant Professors: Arthur D. Hartman, Paula L. Hoffman, Gordon L. Humphrey, Loren G. Martin,* Marshall S. Millman, John L. Semmlow.*

Participating Staff

Assistant Professors: Myron Evanich, Signe M. Kilen.

Instructors: Irwin S. Mendelson, Evelyn Ralston (visiting).

PY-307. Applied Physiology. F. 4 qh. Hawley.
PY-350. Physiology of Pregnancy. W. 2 qh. Hawley.
PY-369. Human Physiology. F. 5 qh. Humphrey.
PY-370. Human Physiology. W. 4 qh. Humphrey.
PY-371. Human Physiology. Sp. 5 qh. Humphrey.
PY-401. Physiology of the Endocrines. Sp (to be offered in 1976). 4 qh.
PY-405. Physiology of the Heart. Sp (to be offered in 1976). 3 qh.
PY-416. Biochemistry and Physiology of Muscle Contraction. W. 2 qh. (Same as BC-416.) Bárány.
PY-420. Neural Correlates of Behavior. W (even years). 3 qh. Rodgers.
PY-422. Vestibular Physiology. W. 3 qh. Torok.
PY-440. Special Topics in Physiology. (Consult department for subtitle.) F. 3 qh. Staff.
PY-441. Special Topics in Physiology: Stress Physiology. F (even years). 3 qh. Marotta.
PY-442. Special Topics in Physiology: Pulmonary Physiology. F. 3 qh. Sharp.
PY-443. Special Topics in Physiology: Pathophysiology. F. 3 qh. Bramante.
PY-444. Special Topics in Physiology: Renal Physiology. Sp. 3 qh. Kurtzman.
PY-469. Methods in Experimental Physiology. F. 3 qh. Staff.
PY-470. Methods in Experimental Physiology. W. 3 qh. Staff.
PY-471. Methods in Experimental Physiology. Sp. 3 qh. Staff.
PY-486. Cell Physiology. F (even years). 5 qh. Loizzi.
PY-488. Transport Across Cell Interphases. W (odd years). 3 qh. Omachi.
PY-491. Seminar in Physiology. F, W, Sp. 2 qh. Loizzi.

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* Affiliate.

PY-493. Research in Physiology. F, W, Sp, Su. 1 to 16 qh. Staff.

PY-494. Tactics and Strategy of Research in Physiology. F, W, Sp. 2 qh. Hartman.

PUBLIC HEALTH SCIENCES

The Department of Public Health Sciences is dedicated to educational programs that will prepare persons for careers in disease prevention, health promotion, and environmental protection. Course work and independent research opportunities leading to a Master of Science degree are offered in the following:

- The fundamental concepts and techniques of epidemiology and biometry along with their practical applications.
- The basic philosophies, technologies, and practices of health care and program administration.
- The identification and assessment of the economic and political factors related to the organization and delivery of health services.
- The interaction of health and disease with environmental and social factors and the resultant effect on the well-being of the individual and the community.
- The dependence of health programs on individual and group understanding of hygienic principles and the significance of the social structure and of the medium of education and information exchange in achieving this end.
- Specialized study areas essential to the successful conduct of personal health care, environmental health activities, and community health functions.

The Master of Science program in the Department of Public Health Sciences requires 72 quarter hours, divided as follows:

Biometrics in Public Health I	3 quarter hours
Principles of Epidemiology	3 quarter hours
Program Area(s)	13 to 23 quarter hours
Electives and seminars	21 to 31 quarter hours
Research	22 quarter hours
Total	72 quarter hours

Through an intercampus program (see section IV-5), students registered in degree programs in the Department of Health and Safety Education at Urbana-Champaign may take part of their course work in the School of Public Health to obtain an increased emphasis on community health education.

Graduate Faculty

Professors: Bernard H. Baum, Bertram W. Carnow, William H. Creswell,* Viron Diefenbach, Alan W. Donaldson, Henry M. Gelfand, Abraham Gelperin, S. G. Huneryager,* Benjamin C. Johnson, Wadie W. Kamel, Edward A. Lichter, Dale E. Mattson, Maurice A. Mufson,* Virginia M. Ohlson,* Paul Q. Peterson, Mabel Ross, Ethel Shanas,* Arthur H. Wolff.

Associate Professors: Lyndon R. Babcock, Jr., John P. Bederka,* Badi M. Boulos, Edwin H. Chen, Win L. Chiou,* Robert Cohen, Theodore C. Doege, Clyde C. Doughty,* Leo Levy, Paul Levy, Robert F. Locke,* Roger J. Meyer, Robert L. Northrop, Wallace H. Wilson.

Assistant Professors: W. Carey Hanly,* Saul H. Rosenberg, Louis Rowitz, Richard Wadden.

Participating Staff

Professors: Bruce Douglas, Hiram Sibley.

Associate Professors: Cornelius Askew, Jr., Swailem Hennein, Binyamin Lebovits, Mary Jane Schlinger.

Assistant Professors: Gary Brenniman, Joel Cowen, Kevin Croke, Alvin Miller.

HA-300. Principles of Epidemiology. F, W. 3 qh. Gelfand and Staff.
HA-301. Epidemiologic Methods. W. 3 qh. Doege, Johnson.
HA-310. Current Problems in Epidemiology: Infectious Diseases. Sp. 2 qh. Northrop.
HA-311. Current Problems in Epidemiology: Non-Infectious Diseases. Sp. 2 qh. Johnson.
HA-393. Independent Studies in Epidemiology. F, W, Sp, Su. 1 to 3 qh. Staff.
HA-491. Critical Reading of Current Literature. W. 2 qh. Gelfand and Staff.
HB-300. Biometrics in Public Health I. F, Su. 3 qh. Mattson and Staff.
HB-301. Biometrics in Public Health II. W, Sp. 3 qh. Mattson and Staff.
HB-310. Computers in the Health Sciences. W, Sp. 2 qh. Chen.
HB-350. Sampling and Survey Methods I. W. 3 qh. Levy.
HC-300. Contemporary Health Care Services. F, Sp. 3 qh. Lichter, Wilson.
HC-311. Health Care Services: The Community Microsystem. W. 3 qh. Wilson.
HC-312. Health Care Services: The Community Macrosystem. Sp. 3 qh. Wilson.

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* Affiliate.

HC-313. Evaluation and Assessment of Health Services. W. 3 qh. Askew.
HC-321. Human Development II. W. 3 qh. Meyer.
HC-366. Sociology of Mental Disorders. W, Sp. 3 qh. Rowitz.
HC-367. Sociology of Mental Retardation. Sp. 3 qh. Rowitz.
HC-370. Mental Hygiene and Public Health. F, Sp. 2 qh. Ross.
HC-391. Seminar in Urban Medicine. W, Sp, Su. 2 qh. Lichter and Staff.
HC-441. Maternal and Child Health I. W. 3 qh. Cohen.
HC-442. Maternal and Child Health II. Sp. 3 qh. Cohen.
HC-451. Chronic Disease — Aging I. W. 3 qh. Gelperin.
HC-452. Chronic Disease — Aging II. Sp. 3 qh. Gelperin.
HC-469. Mental Health in Urban Areas. W. 2 qh. L. Levy.
HE-300. Principles of Environmental Quality. F, Sp. 3 qh. Babcock, Brenniman, Holden, Wadden.
HE-301. Elements of Community Hygiene. W. 3 qh. Hallenbeck, Holden.
HE-311. Water Resource Management. Sp. 4 qh. Wadden, Brenniman.
HE-414. Radiological Health. Sp. 4 qh. Wolff, Miller.
HE-465. Management of Land and Urban Resources. W. 4 qh. Babcock.
HE-475. Environmental Policy Implementation. Su. 2 qh. Wolff and Staff.
HI-321. Environmental and Occupational Laboratory. W. 3 qh. Wadden, Miller.
HI-391. Environmental Health Seminar Series. F, W, Sp. 2 qh. Staff.
HI-440. Special Topics in Public Health Sciences. (Consult department for subtitle.) F, W, Sp, Su. 1 to 5 qh. Staff.
HI-493. Research in Public Health Sciences. F, W, Sp, Su. 1 to 16 qh. Staff.
HM-300. Basic Management Principles in Public Health. F. 3 qh. Diefenbach and Staff.
HM-310. Principles of Areawide Health Planning. W. 3 qh. Sibley and Staff.
HM-312. Data Collection and Analysis for Areawide Health Planning. Sp. 3 qh. Cowen.
HM-320. Health and the Political Process. W. 2 qh. Douglas.
HM-325. Managerial Economics Applied to Health Programs. W. 3 qh. Croke.
HM-340. Legal Foundations of Public Health and Medical Care. W. 3 qh. Diefenbach and Staff.
HM-451. Organization Theory Applied to Health Programs. F. 3 qh. Baum.
HM-452. Administrative Practices in Health Settings. W. 3 qh. Huneryager.
HM-453. Health Personnel Management. Sp. 3 qh. Baum.
HM-454. Advanced Management Skills in Public Health. Sp. 3 qh. Diefenbach and Staff.

HM-465. Communications and Promotional Health Strategy. W. 4 qh. Schlinger.

HO-300. Principles of Occupational Health and Environmental Medicine. F, W. 3 qh. Carnow and Staff.

HO-351. Occupational Psychology. Sp. 3 qh. Lebovits.

HO-415. Environmental Toxicology I. W. 3 qh. Boulos.

HO-416. Environmental Toxicology II. Sp. 3 qh. Boulos.

HO-444. Occupational Safety. Su. 2 qh. Miller.

HP-300. International Health and Population Dynamics. F, W. 3 qh. Kamel and Staff.

HP-320. The Story of Health. W. 2 qh. Kamel and Staff.

HP-350. Introduction to Demography. W. 2 qh. P. Levy.

HP-410. International Health Studies. Sp. 2 qh. Kamel and Staff.

HP-411. International Health Programs. Sp. 2 qh. Kamel and Staff.

HP-420. Family Planning Programs. Sp. 2 qh. Kamel, Hennein and Staff.

RADIOLOGY

The graduate curriculum in radiology leads to the M.S. degree. Work in the field is provided to stimulate the development of critical investigators and knowledgeable teachers.

The M.D. or D.D.S. degree is a prerequisite except that students may be accepted on a selective basis if they are pursuing work toward the M.D. degree. The M.S. degree is not awarded before the requirements for the M.D. degree are completed.

Courses required of all candidates are RA-401, RA-402, RA-403, and at least 20 quarter hours in RA-493 and one seminar in a basic science each quarter for three quarters. Attendance is also required at departmental conferences and seminars.

Graduate students of the physical and biological sciences who are candidates for advanced degrees in these fields may register for all courses except RA-493.

Graduate Faculty

Professors: Vlastimil Capek, Horace C. Dudley, Seymour H. Yale.*

RA-401. Radiation Physics for Medical Application. F. 2 qh. Dudley.

RA-402. Radiation Physics for Medical Application. W. 2 qh. Dudley.

RA-403. Radiation Physics for Medical Application. Sp. 2 qh. Dudley.

RA-410. Radioactive Isotopes: Fundamentals of Radioactivity. F, W, Sp. 1 qh. Capek, Dudley.

RA-493. Research in Radiology. F, W, Sp, Su. 1 to 16 qh. Capek.

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* Affiliate.

SURGERY

Graduate training in surgery leading to the M.S. degree is designed to introduce the surgeon to the formal aspects of research so that he may recognize research as a vigorous endeavor with a sophisticated methodology. Our goal is to prepare a surgeon for a career as a research physician if that is desired. Surgeons should learn to plan research imaginatively, execute research effectively, and assess research progress critically. The candidate must devote the major portion of his or her time to research; it is expected that the research will reflect the basic science components of surgery and medicine. The student must also be cognizant of the clinical and scientific phases of preoperative and postoperative care as well as surgical convalescence; this knowledge cannot be achieved by pursuit of the basic sciences alone. There must also be exposure to the art of surgical techniques, though the time so devoted shall not apply toward credit in the Graduate College.

The M.D. degree is required for admission with the exception that medical students who have completed one year of the medical curriculum may apply. Such candidates are not granted a graduate degree until they have completed requirements for the M.D. degree.

The formal graduate course requirements should be met by taking courses offered in the basic sciences which support the student's research interests. Attendance at surgical-pathology conferences and the journal club is required.

Graduate Faculty

Professors: Sheldon O. Burman, Samuel S. Clark, Tapas K. Das Gupta, William J. Grove,* Gerald Owen McDonald, Gerald S. Moss, Lloyd M. Nyhus, William Schumer.

Associate Professors: Olga Jonasson, Sidney Levitsky.

SU-491. Seminar. F, W, Sp, Su. 3 qh. Staff.

SU-493. Research in Surgery. F, W, Sp, Su. 1 to 16 qh. Staff.

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* Affiliate.

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Spring Quarter 1976

March 26 (Friday)	Last day for completion of degree requirements without further registration
March 29 (Monday)	Instruction begins
April 7 (Wednesday)	Last day for late registration
April 16 (Friday)	Good Friday–holiday (no classes)
April 30 (Friday)	Last day to withdraw from a course, change program, or change registration from audit to credit
May 3 (Monday)	Admissions application for summer quarter due
May 7 (Friday)	Last day for Graduate College approval of thesis format for spring quarter
May 14 (Friday)	Last day for deposit with Graduate College of approved theses for spring quarter, and for addition of names to spring quarter graduation list
May 31 (Monday)	Memorial Day–holiday (no classes)
June 4 (Friday)	Commencement
June 7-11 (Monday-Friday)	Examination period
June 12 (Saturday)	Quarter ends

Summer Quarter 1976

June 14-18 (Monday-Friday)	Registration
June 18 (Friday)	Last day for completion of degree requirements without further registration
June 21 (Monday)	Instruction begins
June 30 (Wednesday)	Last day for late registration
July 5 (Monday)	Independence Day–holiday (no classes)
July 30 (Friday)	Last day to withdraw from a course, change program, or change registration from audit to credit
August 6 (Friday)	Last day for Graduate College approval of thesis format for summer quarter
August 13 (Friday)	Last day for deposit with Graduate College of approved theses for summer quarter, and for addition of names to summer quarter graduation list
August 30-September 3 (Monday-Friday)	Examination period
September 4 (Saturday)	Quarter ends; degrees conferred

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